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# TRANSACTIONS

OF THE

# AMERICAN

# ENTOMOLOGICAL SOCIETY.

VOL. XXIII.

HALL OF THE ACADEMY OF NATURAL
SCIENCES OF PHILADELPHIA,
LOGAN SQUARE.

1896.

PRESS OF
P. C. STOCKHAUSEN.
PHILADELPHIA.

PRINCETON THEOLOGICAL SEMINARY

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# LIST OF MEMBERS

OF THE

# AMERICAN ENTOMOLOGICAL SOCIETY

OF

## PHILADELPHIA, PA.

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Preliminary meeting, Feb. 14, 1859, of Ezra T. Cresson, James Ridings and George Newman, resulting in the issue of a call for the organization of an entomological society.

Organized as "The Entomological Society of Philadelphia" Feb. 22, 1859; incorporated under this title, under the laws of the State of Pennsylvania, April 11, 1862; name changed to "The American Entomological Society" Feb. 23, 1867.

### LOCATIONS OF THE SOCIETY.

From Feb. 14, 1859, to March 1, 1859,—728 Erie Street (residence of Mr. E. T. Cresson).

From March 14, 1859, to June 27, 1859,—1325 Spruce Street (residence of Dr. J. L. LeConte).

From July 11, 1859, to Dec. 26, 1859,—S. E. corner 13th and Market Streets (third story "Druid's Hall").

From Jan. 9, 1860, to July 14, 1862,—1310 South Street.

From Aug. 11, 1862, to Jan. 10, 1876,—518 S. 13th Street.

From Feb. 14, 1876, to present date,—Hall of the Academy of Natural Sciences, 19th and Race Streets.

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Resolution for establishment of a Society Cabinet adopted Nov. 28, 1859; first donation thereto recorded Jan. 23, 1860.

Resolution for establishment of a Society Library adopted Dec. 12, 1859, but first donation of books recorded May 9, 1859.

Crumrine, Boyd. Washington, Pa. Feb. 12, 1872.
Currier, W. O. Providence, R. I. Aug. 10, 1863.
DeForrest, Robert. New York, N. Y. March 9, 1863.
De Gray, Thomas (Lord Walsingham). England. 1872.
*Drexler, C. F.* Washington, D. C. Dec. 26, 1859.
Dunn, J. California. March 11, 1872.
*Edwards, Henry.* New York, N. Y. June 13, 1870.
Edwards, William H. Coalburgh, W. Va. Aug. 8, 1859.
Fay, H. T. Columbus, Ohio. Oct. 14, 1861.
*Felder, Dr. Cajetano.* Vienna, Austria. Aug. 14, 1865.
Findlay, Rev. Samuel. Warren County, Ohio. Dec. 8, 1873.
*Fitch, Asa.* Fitch's Point, N. Y. Oct. 8, 1860.
French, George H. Springfield, Ill. Jan. 23, 1890.
*Fuller, Andrew H.* New York, N. Y. March 11, 1872.
*Gabb, William H.* San Francisco, Cal. May 12, 1862.
Gissler, C. F. Jersey City, N. J. Jan. 12, 1874.
*Glover, Townsend.* Washington, D. C. Oct. 8, 1860.
Graff, Edward L. Brooklyn, N. Y. Jan. 12, 1863.
Grote, A. R. Bremen, Germany. April 14, 1862.
*Gundlach, Dr. Juan.* Havana, Cuba. Jan. 11, 1864.
*Hagen, Hermann A.* Cambridge, Mass. Dec. 8, 1867.
*Haldeman, S. S.* Columbia, Pa. Dec. 12, 1859.
Hamilton, John, M.D. Allegheny, Pa. Dec. 17, 1896.
*Harold, Baron E. von.* Münich, Germany. June 9, 1873.
Harvey, Leon F., M.D. Buffalo, N. Y. May 10, 1875.
Hathaway, George H. Chicago, Ill. June 13, 1864.
Hauverman, A. D., M.D. Chattanooga, Tenn. June 12, 1871.
Healey, David, Jr. Lowell, Mass. Dec. 11, 1865.
Helmuth, Dr. Charles A. Chicago, Ill. Feb. 10, 1862.
*Hewston, George, M.D.* San Francisco, Cal. Dec. 12, 1870.
Hill, George S. I. Canada. Nov. 10, 1862.
Holdenworth, Henry. Shanghai, China. 1870.
Howard, W. I. Central City, Col. March 10, 1862.
Hunt, George. Providence, R. I. Jan. 15, 1866.
Hunt, Howard A. Burlington, N. J. Sept. 11, 1865.
*Jekel, Henry.* Paris, France. Jan. 15, 1866.
*Juelich, Wilhelm.* New York, N. Y. Aug. 14, 1865.
*Kennicott, Robert W.* Chicago, Ill. July 13, 1863.
Kirby, William F. London, England. July 10, 1871.
Kirkpatrick, John. Cleveland, Ohio. Oct. 10, 1864.

*Kirtland, Dr. J. P.* Cleveland, Ohio. March 9, 1863.
Kraft, Louis P. Belleville, Ill. July 10, 1871.
Lake, Henry C., M.D. New York, N. Y. June 12, 1865.
*LaPorte, Francis F.* Melbourne, Australia. June 13, 1870.
*LeBaron, Dr. William.* Geneva, Ill. Oct. 14, 1861.
Legrande, Augustin. Mexico. March 12, 1866.
Lindheimer, F. S. New Braunfels, Texas. Nov. 14, 1859.
Lintner, J. A., Ph.D. Albany, N. Y. Nov. 10, 1862.
Lorenzen, Henry. New York, N. Y. Sept. 9, 1867.
Loweree, F. H. B. Guadalajara, Mexico. July, 10, 1865.
McLachlan, Robert. London, England. Dec. 10, 1866.
Mann, B. Pickman. Cambridge, Mass. May 10, 1875.
Mead, Theodore L. New York, N. Y. Nov. 9, 1868.
*Melsheimer, Dr. F. E.* York, Pa. April 25, 1859.
Mendenhall, R. J. Minneapolis, Minn. May 10, 1869.
*Meske, Otto von.* Albany, N. Y. 1870.
Miles, M. Lansing, Mich. Jan. 12, 1863.
Minot, Charles S. Boston, Mass. Jan. 11, 1870.
Moreno, Aniseto Mexico. March 12, 1866.
*Morris, Beverly R., M.D.* Toronto, Canada. Dec. 8, 1862.
*Morris, Rev. John G.* Baltimore, Md. April 25, 1859.
Müller, Albert. London, England. June 12, 1871.
Myer, Julius. Brooklyn, N. Y. Oct. 10, 1864.
Nason, William A. Algonquin, Ill. Jan. 13, 1862.
Nieto, José A. Mexico. March 12, 1866.
*Norton, Edward.* Farmington, Conn. Oct. 14, 1861.
Osten Sacken, Baron R. von. Heidelberg, Germany. March 28, '59.
Packard, A. S., Ph.D. Providence, R. I. Oct. 14, 1861.
Peck, George W. New York, N. Y. Jan. 15, 1866.
*Pettit, John on.* Grimsby, Canada. Nov. 12, 1866.
Poe, James H. Portsmouth, Ohio. Aug. 11, 1862.
*Poey, Felipe.* Havana, Cuba. Jan. 11, 1864.
*Pool, Isaac.* Chicago, Ill. Oct. 14, 1861.
Putnam, F. W. Salem, Mass. Sept. 11, 1865.
*Rathvon, S. S.* Lancaster, Pa. Oct. 13, 1862.
Reber, Abraham S. Howard, Centre Co., Pa. Jan. 13, 1862.
Reed, Edmund Baynes. London, Canada. Nov. 13, 1865.
Reizenstein, Baron von. New Orleans, La. June 12, 1865.
Rich, Harvey J. Brooklyn, N. Y. Dec. 8, 1862.
*Riley, Charles V.* Washington, D. C. Nov. 13, 1865.

Riotte, Charles N. Costa Rica. Jan. 11, 1864.
*Robinson, Coleman T.* New York, N. Y. Feb. 13, 1865.
Ross, Alexander M., M.D. Toronto, Canada. 1871.
Russell, A. B. Shreveport, La. March 12, 1866.
*Sachs, Hermann.* New York, N. Y. Sept. 9, 1867.
*Sallé, Auguste.* Paris, France. Jan. 15, 1866.
*Sanborn, Francis Gregory.* Boston, Mass. Feb. 13, 1865.
*Sartorius, Dr. C.* Mexico. Jan. 12, 1863.
Saunders, William. London, Canada. Oct. 13, 1862.
Saussure, Henri de. Genève, Switzerland. Jan. 15, 1866.
*Say, Mrs. Lucy W.* Newburg, N. Y. April 13, 1863.
Scudder, Samuel H, Ph.D. Cambridge, Mass. Oct. 14, 1861.
Selys-Longchamps, Baron Edmond de. Liege, Belgium. Feb. 15, '94
*Shimer, Henry, M.D.* Mt. Carroll, Ill. Dec. 10, 1866.
Slosson, Mrs. Annie Trumbull. New York, N. Y. June 8, 1891.
*Smith, George D.* Boston, Mass. Jan. 12, 1863.
Sommer, M. C. Hamburg, Germany. Oct. 9, 1865.
Sonne, Charles. Chicago, Ill. Nov. 14, 1864.
Sprague, Henry S. Buffalo, N. Y. July 13, 1863.
*Stainton, H. T.* London, England. Nov. 9, 1863.
*Stauffer, Jacob.* Lancaster, Pa. Oct. 13, 1862.
Strecker, Herman, Ph.D. Reading, Pa. Nov. 12, 1866.
*Stretch, Robert H.* San Francisco, Cal. 1870.
Suffert, E. Friedenau (Berlin), Germany. Nov. 13, 1865.
*Sumichrast, Francois.* Mexico. March 12, 1866.
Talbot, Robert Bancker. New York, N. Y. March 9, 1863.
*Tatnall, Edward, Jr.* Wilmington, Del. July 13, 1863.
Tepper, F. W. Brooklyn, N. Y. July 13, 1863.
Tepper, John. Brooklyn, N. Y. Aug. 10, 1863.
*Thomas, Cyrus.* Murphysborough, Ill Dec. 9, 1861.
Thomas, W. H. B. Mount Holly, N. J. July 23, 1860.
*Trimble, Dr. Isaac P.* Newark, N. J. Dec. 11, 1865.
Uhler, John C. Lebanon, Pa. Oct. 23, 1860.
Uhler, Philip R. Baltimore, Md. May 9, 1859.
Ulke, Henry. Washington, D. C. March 28, 1859.
*Van Patten, C. H.* San José, Costa Rica. Oct. 14, 1872.
*Walsh, Benjamin D.* Rock Island, Ill. Oct. 14, 1861.
Walsingham, Lord (see De Grey).
*Weidemeyer, J. W.* New York, N. Y. July 11, 1859.
*Westwood, J. O.* Oxford, England. Nov. 14, 1864.

Whiteman, J. S. Farm School, P. O., Centre Co , Pa. Aug. 13, '60.
Wild, J. P. Egg Harbor City, N. J. March 9, 1863.
*Wingate, J. D.* Bellefonte, Pa. June 25, 1860.
Wood, William H. S. New York, N. Y. Nov. 11, 1861.
*Xanthus, John.* Jan. 12, 1863.
Zeigler, Rev. Daniel. York, Pa. April 13, 1863.

## FORMER RESIDENT MEMBERS.

*Biddle, George.* July 10, 1865.
*Breed, Rev. W. P.* Dec. 8, 1862.
*Bucknel, Rufus.* Nov. 14, 1864.
*Bunte, Theodore.* Feb. 13, 1860.
*Cadwallader, William.* April 9, 1860.
*Cassin, John.* March 13, 1865.
Cope, Edward D., Ph.D. June 12, 1865.
*Crozer, Robert H.* Dec. 12, 1864.
Daly, Thomas. March 25, 1861.
*Davis, W. M., Jr.* June 8, 1874.
*Dixon, George B.* April 10, 1865.
Dowling, J. D. Nov. 26, 1860.
*Drexel, Joseph M.* March 11, 1867.
Dunbar, Hugh. July 11, 1859.
Dunkerly, Joseph. May 23, 1859.
Eckfelt, John W., M D. June 8, 1874.
Engelhard, F., Ph D. Sept. 26, 1859.
*Ennis, Jacob.* Jan. 28, 1861.
*Frazer, Robert.* Nov. 11, 1861.
Gallierd, George W. Dec. 9, 1861.
Getz, John. May 12, 1862.
Gropengeiser, Lewis. July 25, 1859.
Grote, Augustus R. Nov. 9, 1863 (Corresponding Member).
*Haines, John S.* March 11, 1867.
*Haines, Reuben.* Oct. 8, 1866.
Hart, Charles H. April 9, 1866.
Heussner, Ferdinand. July 9, 1866.
*Hewston, George, M.D.* March 11, 1861.
Kay, William. April 25, 1859.
Keating, John W. March 10, 1862.
*Kilvington, Robert.* April 9, 1866.

Kline, Christian. Dec. 8, 1862.
Knight, John. Sept. 26, 1859.
*Knight, J. Frank.* April 25, 1859.
*Leidy, Joseph, M.D.* Feb. 8, 1864.
*Lewis, Samuel, M.D.* Aug. 27, 1860.
Lumbrey, William W. March 11, 1861.
McElroy, Thomas E. March 11, 1867.
*McFarland, Rev. James H.* June 25, 1860.
McMeichel, John. Dec. 9, 1861.
Manuel, Edward A. Nov. 10, 1862.
*Martindale, Isaac C.* Dec. 9, 1889.
Mead, Theodore L. Dec. 14, 1868 (Corresponding Member).
Mitchell, Horace B. July 9, 1860.
Montgomery, William. April 10, 1865.
Neely, Thomas B., D.D. June 8, 1863.
Nuttell, Robert. Nov. 26, 1860.
*Parker, Charles F.* Nov. 11, 1861.
Pennypacker, J. T. Feb. 9, 1877.
*Pine, William S.* June 27, 1859.
Reakirt, Tryon. July 13, 1863.
*Ridings, William.* Feb. 11, 1867.
Royal, William A. Feb. 27, 1860.
*Seeber, C. Ernest.* Nov. 10, 1862.
Shaw, Thomas. May 12, 1862.
Smith, James H. Oct. 22, 1860.
Strecker, Herman, Ph.D. Dec. 10, 1866 (Cor. Member).
*Tatnall, Edward.* Nov. 8, 1875.
Ulke, Henry. April 11, 1859 (Corresponding Member).
*Wenzel, William.* April 11, 1859.
Wiest, Daniel. July 8, 1861.
*Wilson, Rathmell.* March 11, 1867.
*Wilson, William S.* Nov. 10, 1862.
*Wingate, J. D.* July 9, 1860.

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Of many of those mentioned in the preceding lists nothing is known. Any corrections will be thankfully received by the Corresponding Secretary of the Society at the Academy of Natural Sciences, Philadelphia.

# ERRATA IN VOL. XXIII, 1896.

Page 103, line 27. 29, 44 *read* Michthisomini, **MICHTHISOMA**, ***Michthisoma.***
" 104, " 32, for Gen. *read* Captain.
" 106, " 41, for Acan. *read* Arcan.
" 108, " 27, for **Dorchus.** *read* **Dorcas.**
" 110, " 18, for **DORCHAS.** *read* **DORCAS.**
" 113, " 4, for synopsis *read* synopses.
" 113, " 13, for Lagochier *read* Lagocheir.
" 134, " 36, for baswood *read* basswood.
" 142, " 26, for **APORTAX** *read* **APORATAX.**
" 144, " 11, for *Melothia* read *Melothria.*
" 149, " 28, for *Cretægus* read *Cratægus.*
" 181, " 3, for Blake *read* Fox.
" 190, " 18, for 49*O* *read* 49*O*.
" 190, " 22, for Cress. *read* Nort.
" 190, " 25, for **ARGYPON** *read* **AGRYPON.**
" 190, " 26, for **Argypon prædiscæ** *read* **Agrypon prædiscæ.**
" 191, " 14, for *Prædisca* read *Pædisca.*
" 191, bottom line, for or *read* on.
" 192, line 27, for abont *read* about.
" 193, line 31, for **ephestriæ** *read* **ephestiæ.**
" 195, line 6, for " " "
" 195, line 18, for *Ephestria* read *Ephestia.*
" 210, line 3 from bottom, for **Hemiletes** *read* **Hemiteles.**
" 214, after line 3 insert **Lophyrocera nigriceps** sp. n.
" 215, line 4, for Cyprus *read* Cypress.
" 249, line 5 from top, for vein absent *read* vein 5 absent.
" 249, line 13 from top and line 5 from bottom; also page 254, lines 14 and 15 from bottom; also page 255, lines 11 and 17 from top; also page 311, lines 7 and 10 from bottom, for Hydriominæ *read* Hydriomeninæ.
" 258, line 13 from bottom, for Ennomiinæ *read* Ennominæ.
" 287, line 13 from top, for *Xanthorhæ* read *Xanthorhöe.*
" 289, line 11 from top, for *Melanchoria* read *Melanchroia.*
" 298, line 11 from bottom, for *fuscaria* read *perfuscaria.*
" 300, before all species under Leucophthalmia in place of C place L.
" 303, line 20 from top, for *laretaria* read *lautaria.*
" 317, for LEUCULIDÆ *read* LEUCULINÆ.
" 322, line 9 from bottom; also page 326, line 9 from top, for **Chorasplates** *read* **Chlorasplates.**
" 341, before all species of Eucmera, in place of A place E.
" 343, line 8 from bottom, for insects *read* insect.
" 368, between lines 6 and 7 from top, place species *S. vulneraria* Hüb.

The original drawings of Plates VI and VII were not intended to be reduced. By mistake a reduction by photographic process was made, causing the lines above, which indicate the actual length of each species, to be short just three millimeters.

TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XXIII.

# THE TAXONOMIC VALUE OF THE ANTENNÆ OF THE LEPIDOPTERA.

A THESIS PRESENTED TO THE FACULTY OF CORNELL UNIVERSITY MAY 1, 1895, FOR THE DEGREE OF DOCTOR OF SCIENCE.

BY DONALDSON BODINE.

TABLE OF CONTENTS.

INTRODUCTION.—Classification, methods of study, material, methods, normal position.
MORPHOLOGY.—Position, parts, insertion.
HISTOLOGY.—General structure, covering, protective hairs, scales, sense-organs, sense-hairs—three types, pits and rods, cones, "Johnston's organ."
FUNCTION.—Touch, taste, smell, hearing.
EVOLUTION OF ANTENNÆ.—Primitive form, scape, pedicel, clavola, specialization, ventral expansion, pectination, differentiation of sense-hairs, chitinous surface, fixed-hairs, plates.
DISCUSSION OF FAMILIES.—Jugatæ, Frenatæ, Generalized Frenatæ, Specialized Macrofrenatæ, Frenulum-conservers, Frenulum-losers.
SUMMARY.
CONCLUSION.
DESCRIPTION OF FIGURES.

## INTRODUCTION.

The avowed aim of all modern classification in biological science is to group together those forms of life which have a close genetic relationship, and to show how they are related.

Though not always evident at first, there can be no doubt that community of descent affords the surest guide to similarity in the

greatest number of characters. Mr. Darwin* has called attention to the fact that, however unconsciously on the part of the systematist, descent has really entered into the classification in that no matter to what degree the two sexes may differ in the most important characters, they are placed together in the same most limited division, the species. The ideal natural system would consist of a complete genealogical table of all forms, exhibiting the phylogenies of groups and their subdivisions. There could be only one such perfect system, but it would admit of various expression. However far we are from its attainment, we may well be glad that a start has been made in the right direction. The attention of students is now being directed from the analytic to the synthetic aspect of the subject. From a dry, wearying process of sorting and pigeon-holing different forms for convenience in management, we have advanced to a study of their development and of the varying lines of descent through which they have attained their present condition—a study of great philosophic importance and of absorbing interest to the student.

In his "Evolution and Taxonomy,"† Professor Comstock suggests that "the logical way to go to work to determine the affinities of a group of organisms is first to endeavor to ascertain the structure of the primitive members of this group, and then endeavor to learn in what ways these primitive forms have been modified by natural selection, keeping in mind that in each generation those forms have survived whose parts were best fitted to perform their functions." He also suggests that the study be prosecuted by applying the method to a single organ; then to another, and so on till a consistent history is obtained. The essay gives his study of the evolution of the wings of insects, especially of the Lepidoptera, and presents a provisional system of classification based upon the results of that study. At the suggestion of Professor Comstock, and under his direction and encouragement, the present study of the antennæ has been undertaken.

The material for the work has been obtained largely from my own collecting in the vicinity of Ithaca, N. Y., and I have been allowed to avail myself freely of specimens from the extensive collection of the University. The slides of mounted antennæ of all specimens used in the morphological study are deposited in the University collection.

---

* The Origin of Species. New York, 1878, p. 372.

† Evolution and Taxonomy, Wilder Quarter-Century Book, Ithaca, N. Y., 1893, pp. 38-39.

I wish to acknowledge my great indebtedness to Professor Comstock for his constant readiness with suggestion and advice and for the invaluable assistance he has given me through his papers and by personal conversations. I am also under obligations to Mr. Alex. D. MacGillivray for the invariable kindness with which he has aided me in the work.

For morphological study the antennæ were removed from the head, and, after dehydration in 95 per cent. alcohol and subsequent immersion in clearer, mounted in Canada balsam. Each slide was labeled with the name of the species, sex, and the side from which the antenna was removed. The last item is of great importance, as it enables the observer to determine the relative aspects in the subsequent study.

For histological study the antennæ were removed with great care not to tear away the soft parts at the base. Some were fixed and hardened with parts of the head still attached. The chitin forms a dense covering over the softer parts, and it was possible to obtain better results in the fixing and hardening, and especially in the infiltration with collodion, if the antenna was first cut into moderate lengths so as to allow the fluids to work in from the ends. The tissues were fixed in various fluids. The Picro-aceto-sublimate, devised by Dr. P. A. Fish, gave the best results. It is composed of fifty per cent. alcohol, 1000cc.; glacial acetic acid, 5cc.; corrosive sublimate, 5 grams; picric acid, 1 gram. After immersion in this fixer for twenty-four hours, the tissues were passed through 50, 67, 82 and 95 per cent. alcohols and imbedded in collodion. The whole was cleared in the castor-thyme oil mixture*—red oil of thyme, three parts; castor oil, one part. Where extra thin sections were desirable, the cut surface was painted with one per cent. collodion before each section was made. This aided very materially in preventing the tearing away of the softer parts from the tough chitin. For staining, both Delafield's hematoxylin and the simple hematoxylin with a counter-stain of eosin produced excellent results.

After considerable study of the natural attitude of the antennæ in live specimens, both in flight and at rest, and also of the position taken when the insect is killed and spread, the conclusion has been reached that the normal position is assumed when the antennæ are extended directly laterad, with the most specialized surfaces ventrad,

* A New Clearer for Collodionized Objects, P. A. Fish, Proc. Am. Micr. Soc. vol. xv, pp. 86–89, 1893.

and the pectinations, where they exist, arising from the ventral surface. Some exceptions to the last clause will be noted later. This description of the normal position and Fig. 26, representing the denuded head and its appendages of *Sphinx chersis*, will make clear the application of the terms of position and direction employed in the following pages. The natural position varies greatly in different species. In some the antennæ are directed nearly cephalad; in others, almost as nearly caudad; and all the possible positions between these extremes may be assumed. As the antennæ are true appendages, however, the general rule for the normal position of appendages should obtain in all cases.

## MORPHOLOGY.

The antennæ belong to the pre-oral somite, and are usually the most conspicuous pair of appendages of the head. They are slender, segmented organs, and are inserted symmetrically, one on each side of the meson, on the dorso-cephalic surface between or cephalad of the compound eyes. In the Papilionina and Hesperiina, according to Mr. Scudder,* and so far as I have observed, in the other Lepidoptera, the antennæ are inserted at the ends of the suture between the epicranium and the clypeus, see Fig. 26. Kolbe† says that, "In the Diptera, Lepidoptera and Trichoptera, whose mouth-parts are stunted, absent, or transformed into sucking organs, the antennæ are brought very near each other, while in the biting insects they usually are separated from each other." *Micropteryx*, one of the Jugatæ, which has retained its mouth-parts slightly modified, has its antennæ inserted quite far cephalad and relatively far apart; thus it offers a peculiar confirmation of the generalization of Kolbe. It would seem that, since the change in function of the mouth-parts has not yet become complete, as indicated by the presence of those organs in a condition less modified than in the other Lepidoptera, the migration of the bases of the antennæ has not progressed so far as elsewhere in the order. The insertions here are at the ends of the clypeal suture, but the suture itself is strongly curved with the ends bent cephalad.

The proximal segment of the antenna is the largest and is termed

* The Butterflies of the Eastern United States and Canada, in three Vols., by S. H. Scudder, Cambridge, 1889, vol. i. p. 37.

† Einfuhrung in die Kenntnis der Insekten, von H. J. Kolbe. Berlin, 1893, p. 179.

the scape, Fig. 26. Next it is the pedicel, which is smaller than the scape, but larger than the segments immediately distad of it, except among some of the Hesperiina and Papilionina. The scape and pedicel together are often called the base, while all the remaining segments make up the clavola. Among the moths the latter is often pectinate, or feather-like, Fig. 3. There is much confusion in the nomenclature of this form, but in the following pages the general form will be termed pectinate; the part made up of the bodies of the segments, the shaft; and the projections, pectinations; Fig. 8, sh. and pe. Among the skippers and butterflies the clavola is divided into a proximal, thread-like portion, the funicle, or stalk; and a distal, fusiform, or clavate part, the club, Figs. 4 and 5.

The scape is inserted into a little cup-like depression of the head, and is itself more or less rounded in at the proximal end. Very often a constriction causes this end to take the shape of a spherical knob, which, with the corresponding cavity in which it fits, makes a very serviceable ball and socket joint. This permits great freedom of motion in many planes, and to a considerable extent provides for a rotary motion. The scape and pedicel also are joined in such a manner as to allow considerable movement. The other joints, however, are comparatively stiff and afford little or no motion.

## HISTOLOGY.

The scape is abundantly supplied with strong, striated muscles, while in the other segments of all forms I have examined in sections, I have been unable to demonstrate the presence of muscular tissue. Fig. 20 represents a longisection of a segment with the two joints at the ends and shows the shape of the contiguous parts. The chitinous parts are held together by a tough, compact membrane, and it is due to the elasticity of the latter that, when the clavola is flexed by external force, it is able of itself to resume its natural shape. A section of this membrane is well shown in fig. 18, me. Figs. 20 and 22 will make clear the internal anatomy of the clavola. Just entad of the chitinous coat is a layer of varying thickness composed of dermal and nerve-cells with numerous interlacing nerve-fibres. Along the ventral part of the shaft runs a large tracheal trunk supplying the branches to the segments. Just dorsad of this trachea lie a pair of large nerves which come from the frontal ganglion and send out branches to the various organs of sense located in the antenna. The

remainder of the substance found in the interior is the blood, which freely bathes the tissues and provides for their nourishment.

The chitinous covering of the antennæ is of the same general character as that of the body, but it is neither so thick nor so compact in structure. It lies just ectad of the layer of dermal cells making up the limiting stratum of the vital tissues of the insect and is doubtless formed by the secretion from those cells. Its surface is frequently marked off into more or less nearly hexagonal areas, Fig. 34, which, in some cases, are said by various authorities to correspond to the underlying layers of cells. They are limited by very thin, continuous ridges of chitin sometimes, *e. g.* in *Notolophus leucostigma*, Fig. 30, raised as high as 3 *m.* from the surface. In other cases there is an external layer of overlapping plates which may or may not mark the outlines of the dermal cells, Figs. 38 and 39. The surface of the plates is often broken up into fine points and ridges which frequently obscure the outlines of the plates themselves. In still other forms there is a covering of fine hairs which are really simple projections of the chitin itself and quite different from the true hairs described below, Fig. 40.

The many structures found on the antennæ of the Lepidoptera which have originated from the interior may all be regarded as modifications of a simple hair. Each has its origin in a hypodermal cell, and therefore is connected with the interior through a pore-canal. The simplest form is that of a simple, protective hair, situated at the ectal end of a pore-canal. In the structure of the chitinized parts it differs slightly, if at all, from the sense-hair described later, but it lacks any connection with the vital tissues. Whether it is an imperfect form of sense-hair, or whether it is in the condition best adapted to the function it has to perform, is a question we are unable to answer.

A simple flattening out of a hair, followed by some corresponding changes in the secondary details of structure, would give the type of a scale. These also arise from a hypodermal cell, though in the imago the connection is lost. Fig. 16 shows the position and manner of insertion of the scales. The pedicel, or stalk, is set in a goblet shaped cell lying in the chitin with its long axis nearly perpendicular to the surface, but pointing slightly distad. The bottom of the cup is at the end of a pore-canal, but there is no evident vital connection with the interior. When the scale is extracted, or has fallen out, the insertion-cups have the appearance of two externally tangent, or

slightly overlapping circle, the distal one a little the larger. This manner of insertion differs considerably from that found in the wing-membrane and described by Professor Kellogg.* There the cups have their long axes nearly parallel with the surface, and they seem rather to be built up upon the membrane than to be hollowed out of it.

Scales vary greatly in form in different parts of the same antenna. The scape bears a patch of extremely long, little specialized scales spread over the dorsal surface towards the distal end and forming one or two very pronounced, often strongly colored tufts. Single scales of this kind attain great length, while their thickness remains small. One from the scape of a male *Hemileuca maia* measured 1888 x 5.2 *m*. Mr. Scudder says† that in the butterflies (by which term he includes the Hesperiina and Papilionina) the basal part of the base (*i e.*, the scape) is always naked. In many cases, however, these tufts cover at least the distal half of the scape; in some all the surface except that which forms a part of the joint. This tufting is carried to an extreme, or rather it is reinforced in a peculiar manner among the Epipaschiinæ. Here the length of the scales is supplemented by an extension of the dorsal surface of the scape into a long process, which in some species reaches nearly to the abdomen, Fig. 28. This is thickly clothed with long, spatulate scales, the whole forming a very prominent feature in the appearance of the insect. It is regarded by Mr. Hulst‡ as a secondary sexual development.

On the clavola the scales are more specialized, and have the same form as those on the wing of the same insect. Among the moths, for the most part, they are arranged on the dorsal surface in two transverse bands, the scales themselves lying with their long axes parallel with the axis of the clavola, and the free ends pointed distad, Fig. 49. Thus the scales of the distal band cover the joint between the segment on which they are born and the one succeeding. In many pectinate forms the pectinations also bear scales. Even in those antennæ which are scaled apparently over their whole surface, there is a comparatively free space on the ventral and more highly specialized face.

* The Taxonomic Value of the Scales of the Lepidoptera, V. L. Kellogg. Kansas Univ. Quar., vol. iii, No. 1, pp. 49-50.

† The Butterflies of the Eastern United States and Canada, p. 37.

‡ Entomologica Americana, vol. v, p. 44.

Of the various antennal organs which have a communication with nerves, and are therefore presumably organs of special sense, I shall describe six kinds:

1. Short, slender, pointed sense-hairs which are hollow, but closed at the free ends; Fig. 23, 1, shows these in their relation to the rest of the antenna; Fig. 13 represents a section magnified about 500 diameters. The hair is attached to the chitinous ring at the end of a pore-canal. It has been described as movably articulated, but there is no muscular tissue connected with it as with the hair of Mammals. The elasticity of the connecting zone of chitin may allow a certain amount of flexion and of subsequent extension, but it can scarcely be said to be movable in the active sense. In the specimens I have examined the external part of the hair does not exceed 45 *m.* in length, and it is usually more or less flexible. From the interior a fibre from a branch of the antennal nerve passes out into the cavity of the hair. Ruland* says the question whether the nerve, ascending through the pore-canal to a ganglional swelling, ends in the base; or whether it sends up a modified continuation into the interior, is not yet settled. He is unable to decide to his satisfaction. Some of my preparations seem to me to show clearly that the nerve itself extends some distance into the hair. Just entad of the hair lies a large nerve-cell. It is more or less ovate in form, with the smaller end produced into the pore-canal. It contains from three to six nuclei, which are coarsely granular in appearance. An "axis-cylinder" is clearly visible in the apical part of the cell, but it fades from sight toward the middle.

This type of sense-hair has a wide distribution. It occurs very generally in both the Jugatæ and the Frenatæ. Mr. Scudder† says that in no instance has he observed the antennæ of the butterflies clothed with hairs. He doubtless refers, however, to hairs of a different type described below. Those of the first kind are more or less abundant in many forms.

2. Long, very stout and rigid bristles or hairs, closed at the end; Fig. 14 represents a section of one from a male *Callosamia promethea.* These are easily recognizable by their thick base and tapering form, and also by their characteristic insertion. They have a distinct,

* Beitrage zur Kenntniss der Antennalen Sinnesorgane der Insekten, Franz Ruland, Hamburg. Zeitschrift fur wissenschaftliche Zoologie, vol. xlvi, pp. 602–628.

† Butterflies of Eastern United States and Canada, vol. i, p. 37.

compact ring surrounding the point of attachment and rising up around the base of the bristle. They vary greatly in size. They are usually shorter than the third type of sense-hair, but in some cases they are longer. In *Notolophus leucostigma*, Fig. 30, they measure 350 *m*. It is extremely difficult to obtain good sections of the soft parts of these sense-organs, because of the toughness of the chitinous parts, and the ease with which the cellular elements tear away from them in the cutting. As shown in Fig. 14, we have here more than one cell in connection with the sense-hair. I have been unable to determine whether all three are nerve-cells and receive branches from the nerve-trunk. That at least one is supplied with a nerve is certain. At a later date, with fresh material, I hope to devote further study to the histology of this form. Whether in all these cases the cell is really a nerve-cell and has true nerve processes, is a matter of doubt. Whether the nerve is really a part of the cell, or simply intimately connected with it by the apposition of a brush end has not been determined, and could perhaps be satisfactorily demonstrated only by the application of the Golgi method. Whichever condition may be the true one, however, it is doubtless constant in all forms, and so cannot affect the problem under consideration in this paper.

The distribution of the sense-hair of the second type is as wide as that of the first type, but the number is limited to a very few on a single segment.

3. Long, rather stout and stiff hairs which, like those first described, are hollow and closed at the free ends; Fig. 23, 3, shows these in relation to the rest of the antenna, and Fig. 12 represents a section of one from a male *Callosamia promethea*, magnified about 500 diameters. It will be seen from the figure that the structure differs but little from the first type. The nerve-cell, however, is relatively smaller, and the hair is more firmly attached. The external portion of the hair usually measures from 80 to 100 *m*. I have found none less than 75 *m*., while some attain a length of 350 *m*. In distribution they are more limited than the other types. They do not occur in the Jugatæ, nor in the Hesperiina and Papilionina.

4. Pits, or depressions, guarded at the opening by stiff projections of chitin, and containing single rods or cones, which are connected with nerves from the interior; Fig. 15 represents a section of one from a male *Callosamia promethea*. In this species the pit is a depression in the chitin from 8 to 10 *m*. deep, and of about the same

diameter. Rising from the floor is a chitinous cone about 3 *m.* in diameter at the base and 6 *m.* high. The apex is somewhat attenuate and is open. The nervous apparatus is much like that in the first type of sense-hair. It is broader at the apical part and passes directly into the cone, filling the broad base. Sometimes two, or even three of these pits are grown together. In such cases there is a reduplication of all parts. Among the butterflies they are much deeper, and are supplied with stiff guarding projections from the walls, Fig. 17. The cone, also, is smaller in diameter at the base, and is almost or quite rod-like in form. In at least some cases, *e. g. Pyrameis cardui*, there is a circle of stiff points around the base of the cone. Hauser* describes such a bristle circle in *Vanessa io.* Kraepelin and Ruland,† however, from the study of different species, dispute the existence of such a structure. Pits have a wide distribution throughout the whole order. They are found for the most part on the ventral surfaces both of the shaft and of the pectinations. In the butterflies they are most numerous on the club. Hauser says they are not limited to the two terminal segments alone, as Lespes has declared, but are spread over the whole club. In *Vanessa atalanta* I have found them in all but the three proximal segments of the clavola.

5. Short projections which have become so thick as to lose their character of hairs, and which in many cases have a covering continuous with the general integument of the segments; Fig. 20, 5, represents the form of these cones and shows their relation to the segment. Fig. 18 represents a section of one from a male *Callosamia promethea.* The nerve apparatus resembles that of the rods in the pits described under 4. In fact the whole apparatus seems like an everted pit. The termination of the cone varies in different species. In some the end is blunt and even hollowed out; in others there is a fine point at the apex; in still others there are several points, Figs. 41–45. The distribution of the cones is wide. They occur in all the families of the Frenatæ, excepting the Hesperiina and Papilionina, and possibly the Pyromorphidæ. They are not found in the Jugatæ. Notwithstanding their broad distribution, there is usually only a single one on a segment, and in many cases only on the segments of the distal portion of the clavola.

* Physiologische und histologische Untersuchtungen über das Geruchsorgan der Insekten, Gustav Hauser, Erlangen. Zeit. fur wiss. Zool., vol. xxxiv, pp. 367–403 (1880).

† Antennalen Sinnesorgane. Zeit. fur wiss. Zool., vol. xlvi, pp. 602–628.

6. There is another set of nervous apparatus which, though it cannot afford any taxonomic characters, at least not without involving the careful preparation of difficult sections, may throw some light on the question of function. It is always situated in the pedicel. Fig. 19 represents a section through the apparatus in the antenna of a male *Callosamia promethea*. It is a sagittal section of the ventral half of the pedicel, with parts of the adjacent segments; but the apparatus extends around the whole segment, so that a longisection in any plane would present essentially the same appearance. As the antennal nerve-trunk enters the pedicel, it gives off on all sides numerous branches, which extend peripherad. When it approaches the outer wall each nerve bends distad and joins a nerve-cell with a distinct nucleus. Extending distad from the cell is a long, slender rod with one or more nucleal bodies. These rods are gathered into small conical bundles and terminate within pores situated in the membranous ring which connects the chitinized walls of the pedicel and the proximal joint of the clavola. It will be remembered that the base is the movable part of the antenna; while the clavola, except in case of the application of external force, is as one piece. It at once becomes evident that any movement of the clavola upon the base, whether due to its contact with some object or to a vibration caused by a vibration in the air, would be at once felt in the membrane in which these rods lie. As there are rods in every part of this membrane a definite impression of the movement would be produced in the sense-rods.

## FUNCTION.

That the antennæ function as organs of special sense there can be no question. Just what the sense, or senses, may be, we cannot tell, but we may approximate the true character. When we consider how little we know of the essential operations which accompany our own perceptions, we must realize the difficulty of the problem. We can form definite ideas of what sensations are possible to insects mainly by interpretations of physiological action and of histological structure, as compared with similar actions and structures in ourselves and in the higher animals. Doubtless the range of perception in insects is widely different from our own; yet, that there must be considerable similarity in the organs, follows from the fact that the external substances or forces must work through the same media in both cases.

The senses which might be supposed to have their peripheral organs in the antennæ are touch, taste, smell, and hearing. The evidences of their existence we may class under two heads: histological and physiological, normal, and artificial or experimental.

Touch.—A very little observation will convince one that the antennæ are peculiarly sensitive to impressions of touch, and it seems very probable that the several types of sense-hairs already described are especially adapted to the receptions of such impressions. Blix* holds that in man all hairs are organs of touch, though at the same time they serve for protection. The sensation of pressure at least is closely associated with the hairs. In insects where the body is covered with a hard shell of chitin, we may fairly assume that the hairs are even more effective as intermediate organs between the external influence and the nerve termination. It is not at all improbable that the different types of hairs are receptive of different sorts of sensations, as of touch, pressure, weight, etc. The greater abundance of hairs in the nocturnal moths and their sparser distribution among the diurnal forms would seem to be correlated with their use as touch organs. One who has watched *Ctenucha virginica*, or some form of night-flying moth, will have little doubt that the antennæ serve as "feelers." It may not be impossible or even improbable that the sense of touch in these organs is not limited to conditions of actual contact with the objects perceived. Many phenomena connected with the actions of moths possessing these organs very highly developed point to the conclusion that there must be a sort of feeling at a distance such as we know of among some higher forms which are sightless.

Taste.—Histologically, we might suppose it possible that the pits and rods or the cones might function as organs of taste. Some authors hold that during life the pits may be filled with a mucous secretion. I do not think so, but if there were a fluid in them the apparatus would closely approximate the condition found to prevail in the taste organs of the higher animals. Experiments, however, have shown pretty conclusively that taste does not reside in the antennæ. It has been found that by the use of the antennæ wasps† could not distinguish powdered sugar from alum or dolomite, and only recognized the difference when some of the substance reached the mouth.

* Exper. Beitrage zur Losung der Frage über die Specif. Energie der Hautnerven. Zeit. fur Biologie, 1885.

† Das Geschmacksorgan der Insekten. F. Will. Zeit. fur wiss. Zoologie, 1885, p. 674.

Smell.—There can be little doubt that the sense of smell is very acute in the Lepidoptera. Hundreds of species of both moths and butterflies are known to possess special organs for the emission of odors. Dr. Fritz Muller* says that the males of *Didonis biblis*, one of the Nymphalidæ, is able to emit as many as three distinct odors, each kind being produced by a separate apparatus. The possession of contrivances for the emission of such odors would in itself argue the existence of organs for their detection. The wonderful celerity with which the Noctuidæ and Arctiidæ can find "sugar" at trees or in open places lends additional weight to the belief that there must be well-developed organs of smell. The only tenable theory to account for the well-known habit of "assembling" among Lepidoptera is based upon their possession of an extremely acute sense of smell or something very akin to it. This habit is not confined to any one group, though it is most frequently observed among the Saturniina. It has been noted† in many widely separated families, *e. g.*, Hepialidæ, Tortricina, Geometrina, Noctuina, Lymantriidæ, Lithosiidæ, Zygænidæ, etc. The most remarkable example that has come under my notice is recorded in "The Entomologist" of December, 1894. On the 19th of July, 1894, a gentleman of Carnforth, England, placed three females of *Bombyx quercus*, each in a cage of perforated zinc, in a leather collecting bag. On the 20th they were removed, and the bag was carried on a trip to the Isle of Man. On the 24th, after returning to England, the bag was taken to Witherslack Moss and a number of males not only came to it, but even crept inside. Afterwards, at various places, on the 26th, 27th, 29th and 31st, numbers of males came to the bag, *though no females had been in or near it since the 19th*, a period of *twelve days*.

During the early Summer of 1894, a breeding-cage with cocoons of *Callosamia promethea* was placed at one of the windows of the Entomological Laboratory at Cornell University. The window was a second story one, and was directly over a much frequented walk. When the warm days came the window was opened, and after females had emerged great numbers of males came to the cage, flying even in the middle of the day in strong sunlight. On the afternoon of the 15th of June, between three and half-past five o'clock, forty-

* Notes on Brazilian Entomology by Dr. Fritz Muller, Trans. Ent. Soc. London, 1878. pp. 211-223.

† The Entomologist. London, vol. xxv, pp. 84, 121, 163, 218; vol. xxvi, p. 21; vol. xxvii, p. 179.

six males flew into the laboratory and were captured. In all the cases I observed sight appeared to be of little use. The whole approach was made in a more or less indefinite manner, as if they were guided by the varying strength of the scent, and, even when the females were close to them and in plain sight, the males would still fly blindly about striking the sides of the building, and at last reaching the cage only after many wide detours. Dr. Westcott describes, in the "Entomological News" for May, 1895, his experience with *Cecropias*. In four days he took 342 males who came to a cage where females were confined. At one time he counted 218 about the cage at the same time, when it contained only four females.

Males of *Samia cecropia* have been known to anticipate the emergence of the female from the cocoon. In many forms where the female has lost her wings, or possesses them in a very rudimentary condition, she does not fly at all, or does so only to seek a place for depositing her eggs. As many as 183 species have been enumerated where the wings of the females are either greatly reduced or entirely absent. In these cases the males must seek the females, and observations show that they succeed in doing so in a wonderfully short space of time. These are certainly remarkable manifestations of some sense of perception, which, in many respects, must resemble our sense of smell. That the sense here concerned is not in any direct way connected with that of touch or with the sympathetic vibration of sense-hairs or organs, is proved by the example quoted above where the males were attracted to a bag from which the females had been removed for some time. The fact that "assembling" takes place among moths which have filiform antennæ also argues against the view that the pectinate forms by the vibration of their abundant hairs communicate at a distance.

There are many reasons why the pits and rods of the antennæ should be regarded as the peripheral organs of this sense. Histologically, there is much evidence in favor of the view. There is a supporting tissue with a perforated end, which would allow free communication between the air and the nerve or a thin protecting membrane, through which the perception may take place. The origin of the antennal nerve also presents some evidence that the sense of smell resides in the antennæ. Viallanes* says the antennal

* Etudes histologique et organologique sur les centres nerveux et les Organes des Sens des Animaux articules. Ann. de Sci. Nat. Zoologie, Huitieme Serie, T. 14. Paris, 1893. Ff. 405-456.

nerve is provided with two roots; one, ventral, composed exclusively of fibres affected by special sensibility, arises from the olfactory lobe; the other, dorsal, which includes at once motor fibres and fibres of general sensibility, arises from the dorsal lobe of the deutocerebron. Viallanes also shows the correlation between the development of nerve centres and their peripheral organs. In *Libellula*, whose eyes are so large, the optical ganglia acquire unusual dimensions; on the other hand, in the same insect whose antennæ are very small, the olfactory lobes become almost rudimentary. The reverse conditions prevail in ants.

The most plausible argument against the view that the organs of smell are in the antennæ is that stated by Mr. Arkle. He writes* as follows: "In animal organisms the gift of scent is exercised through the respiratory process. Lepidoptera possess this faculty beyond doubt, and, as the air inhaled is the carrying medium, we must look to the spiracles as the organs of smell." This opinion rests upon the assumption that the condition found in the higher vertebrates must also obtain in lower forms. I think this is a mistake. We, who, of all vertebrates excepting the Cetaceæ, have the most rudimentary olfactory lobes, can have little conception of the enormous range of perception, or of the mode of action of the sense of smell in the lower forms. That air is the carrying medium is doubtless true. Air, however, has access to the rods in the pits of the antennæ. The real question at issue, then, is whether a current of air such as would be produced by respiration is necessary, or whether the simple diffusion of the substance in the air would not reach the organs in the antennæ. That the latter condition is sufficient is evident when one considers the state of affairs in the lower vertebrates. Sharks have a highly developed sense of smell. Their olfactory nerves are of great size. Yet, there is probably little or no current of water over the olfactory membranes. In *Amia calva*, a Ganoid with large olfactory nerves, the nasal sac is not connected with the respiratory organs, the only communication with the outside being through a narrow tube opening at its free end above the surface of the head, and a small postnares. A number of different forms do not even have a postnares, *e. g.*, *Petromyzon marinus*. This must mean that a current of the carrying medium is not a necessary factor. The fact that the most careful preparations by skillful his-

* "The Entomologist." London, vol. xxvii, December, 1894, pp. 336-338. See also article by Watson in vol. xxviii, February, 1895, pp. 30-33.

tologists have failed to demonstrate any organs near the spiracles of insects which could be supposed to act as organs of smell, also lends argument against the idea of a current of air caused by respiration. Indeed, if the current is of any advantage, may it not be possible that the waving of the antenna so familiar to all observers would provide for it in sufficient degree.

Many experiments have been made upon insects to determine whether the antennæ are really scent organs. In most cases Coleoptera or Hymenoptera have been used because of their greater ease of manipulation. The most valuable experiments are those conducted by Hauser and described by him in the "Zeitschrift für wissenschaftliche Zoologie," Bd. 34. Auguste Forel* and Sir John Lubbock† have also performed many interesting and instructive experiments. These investigators believe that the sense of smell does reside in the antennæ. Some of them also believe that there may be other parts of the body or other organs which are sensitive to impressions of smell. Some experimenters have arrived at a contrary conclusion. Many of them, however, have in their tests made use of strong odors, often of irritating and corrosive substances, and, in consideration of the extreme delicacy of the sense being tested, it seems to me that their results are untrustworthy.

I have dwelt at such length upon the question of smell because its possession is of such great moment to the Lepidoptera not only in the detection of the whereabouts of their food, but in the more important problem of the perpetuation of their species. A review of all the arguments pro and con has forced the conviction upon me that the pits and rods, and probably the cones also, are the special organs of this sense. No other organs so well adapted are found in the insect and the number occurring in an antenna seems to be correlated with the importance of the use of scent in the life of the species. Hauser‡ says the bees and wasps have 14,000 to 15,000 cavities and about 200 cones in each antenna; the leaf wasps, a smaller number. The flesh and dirt flies have 60 to 150, while the flies that live on plants have only 5 or 6 to each feeler.

Hearing.—It is frequently denied that Lepidoptera possess the sense of hearing, and evidently they pay little attention to the ordi-

* Experiences et remarques critiques sur les sensations des Insectes, Recueil Zool. Suisse. T. 4, 1886.

† On the Instincts and Senses of Animals.

‡ Popular Science Monthly, vol. xxiii, p. 284.

nary sounds which are sensible to our ears. It does not follow, however, that they do not hear sounds of which we are not cognizant. Dr. H. Landois* gives an account of sound-producing organs among insects and describes sounds produced by eleven species of Lepidoptera with which he experimented. In many cases the sounds were weak, but he says the weakness of the tones of many was due partly to the lightness of the sound, partly also to its being of such a nature that it cannot be perceived by human ears. The senses of touch and hearing are doubtless very intimately connected. That the antennal hairs of certain Diptera are auditory organs has been pretty clearly demonstrated, and it is not at all improbable that the antennal hairs of the Lepidoptera may be of some use for the detection of sound. The set of apparatus described under section 6 seems especially adapted to the perception of any sort of delicate pulsations of sound waves. C. M. Child† has described this apparatus, which he terms "Johnston's Organ," as found in the Culicidæ and Chironomidæ, where it has a remarkable development. He believes that its functions as an organ for the perception of both touch and sound, and that the insect is able to distinguish between the two sensations by whether any resistance is offered to the free movement of the antenna.

## EVOLUTION OF THE ANTENNÆ.

In the preceding chapter I have described the general form and structure of the antennæ of the Lepidoptera. I have also endeavored to indicate the character of the organs found upon them and to arrive at some conclusions regarding their function. In the present chapter I shall point out what I believe to be the primitive form of Lepidopterous antenna, and to indicate in a partial manner the paths by which the evolution of the more specialized forms has taken place.

The most generalized form of antenna of existing Lepidoptera so far as I have been able to examine specimens is to be found in the genus *Micropteryx*. The genus contains two distinct types, but *M. semipurpurella* may stand as the representative of the one which

* Die Ton- und Stimm-apparate der Insekten in anatomisch-physiologischen und akustischen Beziehung. Zeit. f. w. Zool. Bd. 17, pp. 105–186.

† Ein bisher wenig beachtete antennales Sinnesorgan der Insekten, mit besonder Berucksichtigung der Culiciden und Chirononomiden. Zeit. f. w. Zool. Bd. 38, 1894, pp. 475–528.

retains in the fullest degree the characters of the stem form. Fig. 1 exhibits the general outline of the entire antenna, and Fig. 53 a single segment more highly magnified, showing the finer structure. It will be noticed that the scape is differentiated from the other segments by its larger size and different shape; that the pedicel is not very different from the proximal segments of the clavola, but the whole base is easily distinguished from the other parts by its covering of very generalized scales. These are like long hairs, while those which make a dense covering over the whole clavola are comparatively specialized, being broad with emarginate apices. The simple, cylindrical segments which compose the clavola show little variation from the common shape and present almost no projections or asymmetrical expansions of the body wall. There are numerous hairs of the first type, especially on the ventral aspect of the distal segments, and a few of the second type. The latter are limited to one, or at most two, on the ventro-distal edge of the segments, and a considerable number in various positions on the apical segment. Other characters appear in the antenna, but for our present purpose those named are the important ones, as indicating what we may fairly predicate of the stem form of the Lepidoptera. We may say, then, that the primitive antenna of the Lepidoptera was made up of a scape large enough to afford room for the strong muscles to provide for the movement of the pedicel, and also to contain the large trunks of tracheæ and nerves which supply the parts distad; of a pedicel large enough to provide space for the nervous apparatus described under section 6 of the preceding chapter; of a clavola composed of numerous segments, probably at least a score, all of them very much alike. What was the character of the chitinous surface we cannot say. Doubtless there were hairs of the first type. There may have already been specialized hairs of the second type.

In the evolution of any complex organ, natural selection has acted upon the different component parts and many lines of specialization may have progressed together. This is true of the antennæ, and in considering them we must necessarily treat of different features separately. The most striking changes are those of general shape. The variations of the scape and pedicel are for the most part within narrow limits and are in the direction of changes in their size relatively to that of the clavola, and in the varying proportions of length and thickness. The scape has undergone modification in two directions according as one or the other of its functions has been of predomi-

nate importance in the action of the antenna. When exact and definite movement became of greater moment, the tendency was towards an increase in diameter and relative shortening of the length. This would provide for a much more advantageous arrangement of the musculature, both as to the direction of the axis of the fibres and the securing of a better leverage for their operation. This line of specialization has reached its climax in the Hesperiina and Papilionina. On the other hand, when the direct movement became of less importance than the separation of the two clavolas and the ability to move them from two distinct and widely separated bases somewhat removed from the head, then selection caused a lengthening of the scape accompanied by little increase in diameter. This line of specialization has progressed quite far in certain of the Microfrenatæ, especially among the Tineina.

The pedicel shows but little variation among the moths. In the more specialized families it is of greater size, relatively to that of the adjacent segments of the clavola, than would be necessary, did it serve simply as a socket whose function was to hold the clavola, while the pedicel itself might be moved by the muscles situated in the scape. It is very probable that the degree of its development is closely correlated with that of the contained nervous apparatus already described.

The greatest variation occurs in the clavola. This is the part which more directly bears the sense organs, and therefore is peculiarly subject to the action of natural selection. We may safely assume that the primitive form of the segments of the clavola was cylindrical, with the whole surface equally provided with hairs, the latter uniting in their function protection and sense-perception. When there came the differentiating modifications of the hairs into different types, and the consequent differentiation of the surfaces of the clavola, the organs specialized for sense-perception came to be more or less localized on the ventral aspect, while those for protection were concentrated on the dorsal. It at once becomes evident that, if the chief function of the antenna is sense-perception, specialization would be in the direction either of enlarging that part which bears the sense organs and thereby providing for an increase in their number and spread, or of increasing the efficiency of the organs themselves. As a matter of fact, both processes went on together.

The extent of the ventral surface was enlarged by progress along

two different lines of specialization. In one there was a projection of the surface ventrad, resulting in a form of antenna in which the line of the joints appears to be thrown out from the line of centers of the segments, and is at the dorsal side of the shaft, Fig. 47. When carried very far this projection is emphasized on the mesal line and a distinct ventral ridge is formed. In the other line of specialization, instead of a ventral expansion, there is a sudden projection of a small portion of the segment at the ventro-distal edge forming a flattened expansion whose lateral edges are produced into the more or less slender prolongations which we call pectinations.

The evolution wrought in the shape of the segments by the earlier and simpler method is a very gradual one. The most generalized forms, *e. g. Micropteryx semipurpurella*, see Fig. 1, shows a slight tendency towards the increased development of the ventral surface. In the Microfrenatæ the development is carried further. Here we invariably find a considerable enlargement, but the surface is usually more or less rounded off. *Pyrausta oxydalis*, Fig. 47, will afford an illustration of what I mean. The stage of the formation of a distinct ventral ridge is best shown in such forms as *Crambus mutabilis*, Fig. 21, where the ridge is thin and attains a width equal to twice the diameter of the shaft proper. This same extreme development is also found among the Sphingidæ, Fig. 46.

The second kind of specialization has undergone a more complex evolution. There can be little doubt that the pectinations arose, perhaps after the first kind of specialization had progressed to a certain extent, as simple extensions of the ventro-distal edges of the segments. The antennæ of the females of those species of which the males have highly specialized pectinate antennæ often afford an insight into the probable successive stages through which the forms have attained their high development. The most instructive series for this study can be found among the Saturniina. All the males of the Citheroniidæ and Saturnidæ have two pairs of pectinations to a segment for at least a portion of the clavolas, while in only a few genera of the Saturnidæ do the females have them. In most cases the females have non-pectinate antennæ or have only a single pair of pectinations to a segment. Whether they have simply lagged behind the males in the process of specialization, or have degenerated from a common form, it is difficult to say. Mr. Poulton* believes

* The external Morphology of the Lepidopterous Pupa; its Relation to that of the other Stages and to the Origin and History of Metamorphosis.—Part IV, by Edward B. Poulton. Trans. Linn. Soc., London, second series, vol. v, Zoology, pp. 246–

that all such cases of sexual inequality have been gradually reached by a degeneration of one sex attended by a corresponding development of the other, and that a tendency towards such an action arose whenever the females were less active than the males. His chief argument for this theory is that the antennal cases of the pupæ are practically alike in both sexes and are larger and more complex than the adult antennæ of the female would warrant, though at the same time less developed than the adult male antennæ. A different explanation, however, may be offered. In these families oviposition takes place very soon after the emergence of the female from the cocoon and neither the male nor female adults seek food to prolong their existence. Their mouth-parts have been lost or have ceased to be functional. If this habit of early oviposition was acquired before the antennæ had time to develop very far, it is plain that there would be little tendency in either male or female to attain better antennæ for aid in the search for food. At the same time the struggle of the males to find the females quickly would cause a sudden and extreme specialization of their antennæ, without a corresponding influence upon the female. Darwin has pointed out that "peculiarities appearing in the males of our domestic breeds are often transmitted either exclusively, or in a much greater degree in the males alone." This would seem the more natural explanation of the condition we find among the Lepidoptera. It is so common to find the female with antennæ much less developed, that it is difficult to believe that they all have degenerated from a form intermediate between the present male and female antennæ. It is a much simpler and reasonable explanation and one which is as fully in accord with the facts to believe that in the large majority of cases the females have simply not kept pace with the males in the specialization of their antennæ.

Whichever may be the true explanation, the comparative study of the series is equally instructive. Degeneration is apt to retrace the steps by which the form was specialized, and so affords nearly as good illustrations of intermediate stages as would the real progressive series.

Another suggestive series is afforded by the gradation of the pectinations on the different portions of the same antenna. The medial and proximal parts show the more advanced stages, while the distal retains the earlier and simpler ones; see the gradation in *Feltia subgothica*, Figs. 9, 11, 10. This, however, is not true in the case of those organs which find their most favorable situation at the distal end.

From a comparative study of these corresponding forms in the two sexes and of a large series of male antennæ, I conclude that the evolution of the pectinations was essentially as follows: A single pair of pectinations originated on the ventro-distal edge of the segment. As development went on there was a steady selection of those forms in which the pectinations had their origin less toward the extreme distal end. The result was that the bases of the pectinations gradually migrated proximad. In addition to this movement there was also a tendency towards a migration dorsad. This last was a slower and a later method of specialization, but one which more directly resulted in an increase of the sensitive ventral surface. Among the Saturniina we find a further development. Here, with the exception of the Bombycidæ proper, we find the pectinations are dorsal, and where they have largely developed and have migrated to the extreme proximal ends of the segments, a second pair have originated as outgrowths from the distal edge of one segment towards the overshadowing pectinations of the proximal edge of the adjacent segment. The earlier form of this is seen in *Automeris io*, Fig. 8, where the distal pair of one segment is so closely apposed to the larger proximal pair of the next, that it is difficult to see the line of junction except with a considerable magnification. In *Tropæa luna* the distal pair have begun to migrate proximad and have become independent of the older and more firmly established ones. In *Samia cecropia* the two pairs of each segment are more nearly equal throughout the clavola, while in *Philosamia cynthia*, Fig. 3, the distal pair have migrated so far proximad as to occupy almost the middle of the segment.

We have seen how natural selection has caused an increase in the area and spread of the sensitive surface. Along with this process there was a differentiation of the hair structures themselves, and doubtless a corresponding increase in their efficiency. It is probable that in the primitive form of antenna a differentiation had already taken place between hairs for protection and for sense-perception. The simplest form of the latter sort has already been described as a hair of the first type. A comparative study of types two and three will show that, while they are quite distinct from the first and from each other, no great change would be necessary to transform the first into either the second or third. Intermediate forms do not exist in the same antenna, but different species show different degrees of variation from the first type.

The long, stout, rigid hair of the second type arose very early, before the separation of the Jugatæ from the Frenatæ, and long before the third type originated. The latter type was developed subsequent to another division which took place after the separation of the Jugatæ from the Frenatæ, and also after the Hesperiina and Papilionina had branched off from the Frenate stem. It departs less widely from the first type, and it is evidently specialized as a touch organ. It reaches its highest development among the Noctuidæ, Lymantriidæ and Arctiidæ.

At first sight the pits are very different from the simple sense-hair. Nevertheless, I believe that in essential characters they differ from them much less than do the hairs of the second type. The antennæ of a female *Epargyreus tityrus* will show that in many of the pits hairs very like those of the first type occupy the place of the short rods found in the more highly developed pits, and different specimens will present various stages of transition from the hair in a comparatively slight pit to a short rod in a deeper one. This shows that the structure is not yet definitely fixed in character, and that it may vary greatly in a short time.

The cones are a distinct development, however, and in all probability originated but once. This must have been after the separation of the Jugatæ and the Frenatæ, and also after the Hesperiina and Papilionina had branched off from the latter. All the Frenatæ, except these two superfamilies and possibly the Pyromorphidæ, possess these organs. They are quite constant in location. In all of the Microfrenatæ, and in most of the Macrofrenatæ, they are distributed one to a segment as shown in Figs. 46-50, and they form a very conspicuous feature of the antenna. In some of the Macrofrenatæ, however, they number more than one to a segment, and in pectinate antennæ they have often migrated from the shaft to a position upon the pectinations. Fig. 25 represents a portion of the ventral aspect of the antenna of *Phryganidea californica* where the cones still occcupy a position on the shaft. Fig. 27, representing a portion of the right antenna of a male *Zeuzera pyrini*, shows this migration with the cones situated part way toward the distal ends of the pectinations. Fig. 30 shows a portion of a pectination of the antenna of a male *Notolophus leucostigma* with the cone at the extreme distal end. Among the Saturnidæ, the number of cones to a segment is greatly increased. Fig. 7 represents a distal portion of the antenna of a female *Tropæa luna* with clusters of cones in the

same position usually occupied by the single one. It is perhaps worth noting here that, while the females are usually behind the males in the development of pectinations, they are not at all deficient in the number or the perfection of the cones.

There is yet another feature which is of importance in determining the relationship of an antenna. This is the character of the surface of the chitinous exoskeleton of the clavola. In the Jugatæ the surface as a whole is even, but has numerous slender prolongations which have received the name of fixed hairs, Figs. 51 and 53. These are not articulated with the chitin as are the true hairs. They are simply points which are continuous with and parts of the general surface and do not originate at the ends of pore canals. In the Frenatæ these are not found, but the surface of the whole clavola is divided up into more or less hexagonal areas bounded by thin continuous plates set normal to the surface, or into a series of more or less imbricated plates with various surfaces and outlines. These two distinct kinds of surface covering are of great importance, as they represent specializations differing in kind, and therefore indicate a dichotomous division in the line of descent. There are other characters which would indicate the same thing, but no other antennal character shows that the Hesperiina and Papilionina branched off from the other Frenatæ after their separation from the Jugatæ. The degrees of specialization attained in this character of surface are also worthy of attention as they sometimes afford clues to the real positions of families.

The surface marking of the chitin of the clavola in the Frenatæ presents a great variety of forms, but with the possible exception of a few apparently aberrant cases it is possible to trace a pretty definite line of development passing through them all. This is important, because it means that the system originated but once. The simplest and probably the most primitive condition exists in the antennæ of the Pyralidina. Here we find the general surface smooth, but divided up into more or less hexagonal areas, fenced off as it were by continuous plates of chitin standing normal to the surface. The areas thus demarcated are said by some authorities to correspond with the outlines of the underlying dermal cells, and it may be that the plates represent the edges of separate areas of chitin developed from the cells as centres. In the adult condition of most forms, however, I do not believe that the arrangement has any relation to the underlying structures. Fig. 34 represents a portion of the an-

tennal surface of a male *Pyrausta oxydalis*, and shows the great regularity of the areas so characteristic of this group of moths. Among the Tortricidæ we find that in most cases the areas become elongated. Fig. 35, a portion of the antenna of a male *Dichelia sulfureana*, shows this condition. This elongation of the areas is carried much farther among the Tineids. *Tinea dorsistrigella*, Fig. 36, shows this extreme lengthening of cells and straightening out of the cross-lines; yet here we still find the plates continuous. The function of these plates is doubtless to strengthen the thin layer of chitin and give it greater rigidity. In those forms which have long slender pectinations we find the longitudinal plates much thicker and heavier, while the transverse ones are less developed and have a tendency to straighten out or to disappear. This is evidently better adapted than the hexagonal arrangement to stiffen these slender forms. Fig. 30 represents the dorsal aspect of a pectination of a male *Notolophus leucostigma*, and shows at the sides some of the plates in profile, while the accentuation of the longitudinal plates is clearly seen in the middle of the figure. Note also that the longitudinal plates extend slightly beyond the end of the pectination. One cannot help being struck with the resemblance between the striæ or ribs of the scales and these thicker ridges on the chitin surface. On the ventral aspect of the same pectination we find a modification somewhat different, but yet along the same line. The abundance of the sense-hairs and the other organs makes a lighter and more delicate surface desirable, and here the transverse plates are either wanting entirely or transformed into longitudinal ones. In fact, we may state it as a general rule that the development of chitin on the ventral and sensitive surface is not carried so far as elsewhere. Fig. 31 represents this condition. In all these forms the general surface is approximately level and the plates represent the only elevations from the surface. Now we come to another development. Fig. 32 represents a portion of the dorsal surface of the antenna of a male *Automeris io*; ab is the mesal line of the shaft, and the part to the left is the extension of the surface upon the pectination. It will be seen that the portion near the meson resembles the condition found in *Notolophus leucostigma*, with this difference however: in *Automeris io* the general surface, instead of being level, rises on one side of each plate so as to make each area constitute a single slope with its crest at the plate on the distal edge. The surface of the sloping area is divided up into ridges with what was originally a transverse plate

at the crest of each ridge. These ridges when greatly developed extend beyond the apex of the slope and give the whole an appearance of being covered with fine points. This modification may be carried to an extreme. *Cerura cinerea*, represented in Fig. 37, will show an unusual degree of development in this direction. As a rule, however, the plates are smaller and more uniform, and form a regular imbricated surface, such as is found in *Hemileuca maia* or *Papilio polyxenes*, Figs. 38 and 39.

In a smaller number of cases the surface rises to the plates on each side, making a double slope, with the plate at the crest. This may be illustrated in the antenna of *Daremma undulosa*, Fig. 33.

As might be expected, the extent to which these surface modifications of the structure of the chitin is carried depends largely upon the development of scales. Where the antenna is heavily clothed, we find usually less departure from the primitive form of surface, especially if the scales are closely and compactly arranged. In most cases the surface of the scape and pedicel is practically smooth. This is doubtless in consequence of the covering of thick tufts of long slender scales, and also because the abundant scales of the vertex of the head afford it sufficient protection.

## DISCUSSION OF FAMILIES.

This chapter will contain a discussion of the antennæ of Lepidoptera by families, or groups of families, as the case may be, and will give my interpretations of the evidences they present, which may be of taxonomic value. In this discussion the provisional classification of Professor Comstock will be followed, because it is the one with which I am most familiar and because I believe it represents the true relationships better than any other.* The characterizations of groups quoted in the following pages are taken from the "Manual." It would be presumptuous for me to propose any changes in the classification, but where the evidence of the antennal structures is contrary to that of the wings, note will be made of such contradictions as indicating the need of further study of the group. To be complete, a classification must take into account all the structures found in the body, and it was for the purpose of adding the evidence of one more organ that the present work was undertaken. In most of those species where the antennæ of the males and females differ

* Manual for the Study of Insects. John Henry Comstock and Anna Botsford Comstock. Comstock Pub. Co., Ithaca, N. Y., 1895.

markedly in the degree of specialization both sexes have been studied, but in the tables and descriptions which follow reference is always made to the conditions found in the males, unless special mention is made that the case is otherwise.

## JUGATÆ.

The suborder Jugatæ was established by Professor Comstock, and was based principally upon important characters in some of the wing structures which represent specializations differing in kind from those of analogous structures in insects of the other suborder.* This division of the order into the Jugatæ and Frenatæ represents the earliest dichotomous division of the stem form of the Lepidoptera. The antennal character which distinguishes between the two lines of descent is the presence in the first of fixed-hairs upon the surface of the clavola; and in the second, of plates or their modifications. Professor Kellogg has already pointed out that the Jugatæ possess fixed hairs upon the wing-membranes; and he regards them as an example of a "persistence of a primitive wing-covering, probably represented in the wing-covering of the living Trichoptera." It may be added that he believes their absence among the Frenatæ is due to a disappearance. I believe that the system of fixed hairs is a distinct kind of specialization, closely resembling that found in the Trichoptera and also in the Diptera and Hymenoptera; while the system of plates with its later developments is just as distinct and differs from the first. If this is so, it indicates that the Jugatæ are more closely related to the Trichoptera than to the Frenatæ; that the stem form passed down in two lines of descent, and that the Frenatæ represent one, while the Jugatæ and the Trichoptera represent subsequent divisions of the other. This conclusion would really mean that the Jugatæ are Trichoptera rather than Lepidoptera. It may at first sight seem that the character of the surface covering is a trivial one and not worthy of so much attention. Darwin, however, laid it down as a geneaal rule that "the less any part of an organization is concerned with special habits, the more important it becomes for classification." We may recall in this connection that certain features apparently of little physiological importance often afford the most reliable characters. This is especially true of surface covering, *e. g.* hair of Mammals, feathers of Birds, scales of Reptiles, etc.

* The Descent of the Lepidoptera. J. H. Comstock, Proc. Am. Ass. Adv. Sc. vol. xli, 1892, pp. 199-200.

There are other reasons for considering the Jugatæ closely allied to the Trichoptera. The possession of a jugum, the branched condition of radius of the hind wings, and some other characters of the venation, the condition of the mouth-parts in *Micropteryx*, all point to the same conclusion. In view of all these indications, it may at least be regarded as an open question whether the Jugatæ are true Lepidoptera.

Another antennal character for the suborders is the absence of cones in the Jugatæ and their presence in the Frenatæ. The cones form a conspicuous feature of the antennæ of nearly all Frenatæ. The only exceptions known to me are the family Pyromorphidæ and the superfamilies Hesperiina and Papilionina. The antennæ of the Pyromorphidæ, however, are all pectinate, and those of the Hesperiina and Papilionina are so peculiarly specialized as to be easily recognizable. The presence or absence of cones, therefore, is a practical recognition character.

The suborder Jugatæ includes two families, the Hepialidæ and the Micropterygidæ, and each is represented in North America by a single genus.

The HEPIALIDÆ.—The members of this family have very generalized antennæ. Their size as compared with that of the body of the insect is extremely small. At the same time they present some evidences that a degeneration has lately taken place, or is even now in progress. Fig. 2 represents the antenna of a female *Hepialus argentata*. The lack of regularity in the segments of the clavola and the incompleteness of the joints would seem to indicate that the character of the segmentation has not yet had time to become fixed, or that it is now in the process of evolution. The fixed hairs are very numerous, and are somewhat stouter relatively than those in *Micropteryx*. Correlated with this abundance of hairs there are few scales. These are inserted along the dorsal aspect of the proximal part of the clavola. The scape and pedicel are large, and are pretty thickly clothed with long scales over nearly their whole surface. The clavolas vary considerably in the number of segments. Thirty-one is the largest number in any of the specimens in the University collection. The ventral expansion of the shaft is inappreciable, and there are no pectinations in any of the forms I have seen. Sense-hairs of the first type are numerous, and there are several of the second type to a segment. Pits are present, but vary greatly in their distribution. *H. argentata* has few; *H. mcglashani* has many, though they are not very highly organized.

The MICROPTERYGIDÆ.—The members of this family have the most generalized antennæ of any of the living Lepidoptera. As has been already noted, I find two types of antenna in the same genus. *Micropteryx semipurpurella* has already been described somewhat at length in the chapter on the evolution of the antennæ, and may stand as a representative of the simpler type. It is so generalized in structure that I can find in it no character which would distinguish it from some of the Trichoptera. Compare it with *Mystacides nigra*, and the striking resemblance in structural characters will be evident. Nor is the resemblance superficial only. The clothing of scales is practically alike in form and arrangement, the same organs exist in both. The only appreciable difference is in the number and relative length of the segments, neither of which characters can be regarded as of any great taxonomic value among the Lepidoptera. The second type exhibits a remarkable peculiarity in the arrangement of the scales. Most of them are gathered into two radiating tufts and have their origin in two circular or oval depressions, one on each side of the distal half of the segment. This is a unique specialization, and I have no idea of its purpose. Fig. 51 represents a segment of the antenna of a male *Micropteryx seppela* (?) and shows this arrangement of scales. *M. purpurella* has the same arrangement on a much smaller scale, and other species vary between these extremes. Another indication of the higher specialization of this type is the presence of very broad, short scales on the scape and pedicel in addition to the ordinary covering of long narrow ones. There are also numerous long curved sense-hairs of the second type which form a sort of pointed sheath around the segment and give it the appearance of that of *Anabolia bimaculata*, one of the Trichoptera.

A comparison of the antennæ of the Hepialidæ and Micropterygidæ will show that those of the former family are more highly specialized. Aside from the specialization in the scales just noted, the antennæ of the Micropterygidæ are very primitive. Pits and rods do occur, but in no case have I been able to find more than a single one to a segment, while in the Hepialidæ there are often many. The nearly naked surface of the clavola in *Hepialus* must also be regarded as an indication of a higher type.

## FRENATÆ.

The suborder Frenatæ is divided by Professor Comstock into two principal sections: the Generalized Frenatæ, including those fami-

lies which "are supposed to retain more nearly than any other Frenatæ the form of the primitive Frenatæ, those that were the first to appear on earth," and the Specialized Frenatæ, including those "that depart more widely from the primitive type of Lepidoptera, being more highly modified for special conditions of existence." The first group is a small one and comprises only five families, none of which are large.

## The Generalized Frenatæ.

I believe the evidences of the antennæ of this group agree with those of the wings as given by Professor Comstock. The five families represent lower branches from the primitive stem, and so have a bond of connection in that none of them have departed very widely from the primitive type. While the evidence is not conclusive enough to show that any two of the families are genetically related, except through the common stem, there are some indications in the structure of the antennæ that the Megalopygidæ and Eucleidæ are more closely connected than any other two families; while the Pyromorphidæ seem to represent a perfectly distinct line of descent. It is evident that if each of these families represents a distinct line of development, the group as a whole will be a homogeneous one only in the sense of containing those forms which are very generalized, and that is the character of the group as given by Professor Comstock. That there is a wide difference between the degree of specialization attained by the members of these families and those of any others is quite certain. I do not think any one familiar with various forms of antennæ would fail to pick out those belonging to this group. The extent to which the scape and pedicel are clothed with scales; the method of insertion of the scales more or less obliquely to the surface, and the irregularity in their arrangement; the scarcity of pits in most forms and the simplicity of their structure; the very slight extent of the ventral expansion of the segments; all are characters which, though perhaps not so constant in all cases as to permit of exact definition of limits, will yet enable one to distinguish these families without much difficulty.

The Megalopygidæ.—The members of this family have very generalized antennæ. The segments are short and numerous. *Megalopyga crispata* has sixty-one composing the clavola. The pectinations arise from the extreme ventral aspect of the shaft and the bases of each pair are closely apposed. They are long and well pro-

vided on the ventral surface with sense-hairs of the third type. An indication of the generalized condition of the antenna is the covering of scales over the whole dorsal surface of both the shaft and the pectinations. The base is covered with long, narrow scales, forming a prominent tuft on the dorsal aspect. On the shaft the scales are little more than flattened hairs. Indeed, for some distance from the insertion-cups they are cylindrical in form, and they are very narrow throughout their length. They are relatively long and stand out obliquely from the surface. These scales are broader and more specialized than some on the wings and other parts of the body, but they show the form characteristic of the family, narrow and lightly pigmented. There is a very small number of both pits and cones, and they are located on the pectinations. The pits are very rudimentary in structure, and, excepting in the possession of a short rod, depart but slightly from the first type of sense-hair. Where the cones appear at all, they have migrated to the extreme distal ends of the pectinations and project from the ends in the midst of the more or less crowded growth of scales.

The PSYCHIDÆ.—The females of all the Psychidæ remain in their larval sacs even in the adult state, and they have become wingless. The males, however, fly, and are compelled to seek the females in their cases before pairing can take place. As might be expected from such conditions, we find the antennæ quite highly developed in certain directions; yet as a whole they are of a very generalized type. As in the Megalopygidæ, nearly the whole surface of the scape and pedicel is covered with long, narrow, hair-like scales, and all of the clavola excepting the ventral aspect is clothed with scales of but little higher type. The greatest development is reached in the pectinations. Relatively, they are the longest found among the Lepidoptera. In *Psyche confederata* some of those near the middle of the clavola attain a length equal to one-half that of the whole antenna. The bases of the pectinations have migrated proximad and occupy a central position on the segments. Hairs of the third type are numerous on the ventral surface of both shaft and pectinations. They are well developed, but have no regular arrangement in their insertion. Pits are rare, and are limited in the forms I have studied to the two or three distal pairs of pectinations. Cones also are rare, and when present are situated at the ends of the pectinations. The antennæ of *Theridopteryx ephemeræformis* present a peculiarity in the joint between the scape and the pedicel. The latter segment is

jointed, not at the apex of the scape in the ordinary way, but is set obliquely on the caudal edge of the apex.

The COSSIDÆ.—The members of this family have well-developed antennæ. The shaft is stout and strongly chitinized. The pectinations are well developed in the males, and in some of the females. The base is clothed with short, broad scales, with rounded or emarginate apices, and with numerous very narrow scales of greater length scattered among the broader ones. On the clavola there are very few scales, and these are confined to the dorsal aspect of the shaft, and even there are quite closely applied to the surface. This is doubtless correlated with the habit of swift flight of these insects, and resembles in this respect the condition so characteristic of such swift fliers as the Sphingidæ. In the Cossidæ, however, the insertion of the scales is not so regular. The pectinations are well supplied over their whole surface with sense-hairs of the third type. They are more abundant, however, on the ventral aspect. The pectinations arise from the ventral aspect of the shaft, but a curious development in *Zeuzera pyrini* gives them the appearance of having migrated dorsad as in some of the highly specialized forms. A transverse, elevated, rounded ridge connects the bases of the pectinations of each segment and causes them to appear as a single continuous growth, joined to the shaft at right-angles. *Prionoxystus robiniæ* presents an unusual arrangement of depressions containing sense-hairs. They lie just dorsad of the bases of the pectinations and extend out for a certain distance upon them. There is a considerable variability in this family in the supply of cones. *Zeuzera pyrini* has as many as two on some of the segments, while *Prionoxystus robiniæ* has only an occasional one. In none of the species are the cones highly developed.

The EUCLEIDÆ.—The antennæ of members of this family present in some respects an unusual condition. Regarded as a whole, they are as generalized as any of the Frenatæ, but they possess cones which show a considerable degree of development. The base is almost entirely clothed with long, narrow scales mingled with many shorter and broader ones. In *Euclea querceti* every part of the surface is covered. The clavola, also, is closely covered, except on the ventral aspect, with broader scales, which, by their loose and irregular manner of insertion, indicate a very low degree of specialization. In *Lymacodes Y-inversa* even the ventral surface of the shaft bears numerous scales. In the pectinate forms the pectinations are heavily

clothed, even to their distal ends, where the scales from three sides unite to form a thick tuft extending beyond the end. The pectinations are ventral, and at or near the distal edge of the segments. *Euclea querceti* is peculiar in having the pectinations of the cephalic side of the antennæ flattened and nearly as broad as the length of the segments, of which they form a part. We find in the Eucleidæ an unexpected development of cones. They are long and slender, and are often several pointed at the apex as in the Megalopygidæ, Fig. 43. Some species have several to a segment. In the pectinate forms the cones have migrated to the apices of the pectinations, where they are protected by the thick tufts of scales before mentioned. Pits are very rare, seldom more than one or two to a segment, and then only on a few segments. I have been unable to find any in *Euclea querceti.*

The antennæ of the Eucleidæ differ markedly from those of the Cossidæ and Psychidæ. Though not supplied with numerous sense-hairs of the second type, they resemble the antennæ of the Megalopygidæ quite closely. A similarity of the surface covering; of the character of the cones; and, where they occur, of the pits also, indicate a relationship between the two.

The PYROMORPHIDÆ.—The Pyromorphidæ have a characteristic form of antenna which can be easily recognized. The segments of the clavola are not enlarged towards their distal ends, and in some forms are even gradually contracted near the joints. The pectinations are comparatively short, are cylindrical and almost clavate in form, and are contracted at their bases where they meet the shaft, so much so that they appear to be articulated with it. The base is thickly clothed with broad, deeply emarginate scales, and the dorsal and lateral surfaces of the shaft and pectinations of the clavola also are covered with a thick coat of scales arranged irregularly. On the pectinations the surface of the chitin is divided into a series of irregular imbricated plates with their surfaces broken up into points which give the appearance of longitudinal striations. Both the chitin and the scales are quite heavily pigmented with dark brown or black, and this in addition to the irregularity of the surface makes it difficult to see as clearly as desirable. I have been unable to find any cones in these forms, but am not at all certain that they do not occur. Pits are present, and are broad and shallow, with convex bottoms and short, pointed rods rising from their rounded apices. Hairs of the first type are particularly abundant, and there are a few of the second.

## The Specialized Frenatæ.

The Specialized Frenatæ are divided into two groups: the Microfrenatæ and the Macrofrenatæ. The Microfrenatæ include those moths in which "the anal area of the hind wings is not reduced, having usually three anal veins, except in certain minute forms where a broad fringe has been substituted for the membrane of this area." The group comprises the superfamilies Pyralidina, Tortricina, Tineina and the family Sesiidæ. The antennæ of the members of this group, with the exception of the Sesiidæ, are quite constant in structure, and can generally be separated from any other Lepidoptera with great ease. The only forms which might cause any difficulty are among the Geometrina in the family Sterrhidæ. The separation of certain species of the genus *Acidalia* from the Microfrenatæ will require some experience on the part of the analyst, nevertheless the antennæ of the Microfrenatæ, with the exception noted above, indicate that the group is a definite one.

We are unable to find constant structural characters in the antennæ which are peculiar to the several families constituting the group. There are characters, however, which throw much light upon their relationships. The antenna of a *Pyrausta oxydalis* may be taken as typical of the Pyralidina. The clavola is long, slender and filiform, composed of many segments all of which are quite similar. Where there is any dissimilarity, the segments of the proximal portion are not so specialized for the increase of the sensitive surface, but are better adapted for the support of the distal portion. Fig. 47 represents a typical segment. The arrangement of scales, the position of the cones, the pits with their conspicuous circle of guarding points, the ventral expansion of the segments, all are features practically constant in the whole superfamily; in fact, with little modification of some parts, they are constant in all three superfamilies. The constant and peculiar character of the three superfamilies, however, is the division of the chitin surface into areas by thin plates normal to the surface. The peculiarity of the condition in the Microfrenatæ is that, however the shape of the included areas may be varied, the bounding plates are continuous, and the general surface remains even, see Figs. 34, 35 and 36. As already stated, I believe the different shaped areas are all modifications of the hexagonal form and represent differences in degree only, not in kind; yet as a rule, the limits of each superfamily are sufficiently separated

in degree to make the use of this character practicable in taxonomic work. The hexagonal form is characteristic of the Pyralidina, see Fig. 34. Among the Tortricina the lengthening process has begun, and the form shown in Fig. 35 is characteristic. Even where little elongation has taken place, the areas are much more irregular, and many of them have sharp angles in their outlines, which are not found among the Pyralidina. In the Tineina the process has been carried much farther and the form shown in Fig. 36 is characteristic. So far as I have examined, none of the Pyralidina has areas of the second or third form; none of the Tortricina has areas of the third form. The only liability of error in the use of this as a recognition character is due to the fact that in a few forms a heavy coating of scales has retarded the progress of the development, and we may find a Tortricid with a surface like a Pyralid, or possibly a Tineid with a surface like a Tortricid or a Pyralid. These cases, however, are rare, and where they do occur, there is usually some other character, such as the long, clavate scape so common among the Tineids, which will make it possible to separate the forms. There are many variations in the antennæ of the Microfrenatæ. The peculiar modification of segments and scales near the middle of the clavola of the male *Desmia funeralis*, Fig. 29, the crest of scales along the base of the clavola of the male *Laodamia fusca*, and of certain of the Tineids, the strange, tufted, membranous expansion of the scape among the Epipaschiinæ, Fig. 28, are examples of some of these variations, but the main structural characters remain the same even in these forms.

There are a few points of structure in connection with some of the families of this group which are worthy of mention. Among the Crambidæ, the ventral expansion is greater than in the other families. It reaches an extreme in *Crambus mutabilis*, Fig. 21, and resembles the form so common among the Sphingidæ. The antennæ of the Pterophoridæ and the Orneodidæ show a wide difference in their structure. Those of the former family are distinctly of the Pyralid type, while the latter are just as distinctly of the Tineid type. I believe a further study of the characters of other organs will prove the Orneodidæ to be more closely related to the Tineids than to either the Pyralids or the Tortricids. The surface marking is Tineid in form, and the scape has the long and slightly clavate shape so common among the Tineids.

The antennæ of the Sesiidæ, which we have excepted from the statements made of the Microfrenatæ, are distinctly different in

structural features and in general appearance from all others of the group. Mr. Butler* expressed the view that the Sesiidæ in their antennal characters are closely allied to the Pyralids and Tineids, and not at all to the Sphinxes, especially to the genus *Hemaris*. He believes that they should be placed between the Pyralids and the Tineids. Every feature he mentions, however, as characteristic of the Sesiidæ, and not found in the genus *Hemaris* can be paralleled in the Sphingidæ, even in the genus *Hemaris*. *Hemaris bombyliformis* was used by him for the comparison. I have not seen that species, but *Hemaris thysbe* presents the very characters he describes and figures in *Sphecia*, except that in both cases the "pencil of rigid hairs" is really composed of rigid scales. Lord Walsingham has already pointed out that Mr. Butler was mistaken in his description of the similarity of structures in the Tineids and Sesiids; and we cannot adopt the view that the antennæ indicate that the proper position of the Sesiids is between the Pyralids and the Tineids. The close resemblance in structure and form in the antennæ of the Sesiids and the Sphinxes certainly points to a genetic relationship. The large, compressed ventral expansion, the fusiform or clavate shape, the peculiar distribution of sense-hairs of the third type, the relative size, development, and position of the cones, the tuft of long, slender, rigid scales, projecting from the distal segment, the character of the chitin surface, are all features common to both the Sesiids and Sphinxes, and no other forms known to me possess the whole combination of characters. The condition of the Sesiids' antennæ is less highly specialized than we find it among the Sphinges; the specialization does not differ materially in extent from that of the other Microfrenatæ, but it has proceeded further in certain directions; so, while the family is properly classed with the Microfrenatæ, I believe it at the same time represents an offshoot of the branch which later on gave rise to the Sphingidæ. Figs. 49 and 46 represent segments of the clavolas of *Sannina exitiosa* and *Daremma undulosa*. Note that the arrangement of the sense-hairs of the third type on the wide, compressed, ventral expansion in *Sannina* is further developed in *Daremma* till there is a large semicircle, within which there are sense-organs.

There is of course a possibility that the great similarity of appearance, and even of structure of an organ may arise from similarity in environment and in the conditions of life, but in the case of the

* Trans. Ent. Soc. London, 1878, p. 121.

Sesiids and Sphinxes the resemblances are more than superficial; they are as marked in the microscopic as in the macroscopic characters, and it is difficult to believe that such forms could arise unless there was some genetic relationship.

## THE SPECIALIZED MACROFRENATÆ.

The Specialized Macrofrenatæ includes "certain moths and all skippers and butterflies. In these insects the anal area of the hind wing is reduced, containing only one or two anal veins." This division is again divided into two subdivisions: the Frenulum-conservers and the Frenulum-losers. The first subdivision contains those moths in which the frenulum has been retained, while the second contains forms "in which the frenulum has been supplanted by a greatly extended humeral area of the hind wings." In a few members of the first group we find no frenulum, but it has evidently been lost late in the life of the species, as closely allied specialized forms still retain it. "Among the Frenulum-losers," on the other hand, "the loss of the frenulum occurs while the race is still in a very generalized condition, no trace of a frenulum being found among these insects, except a rudiment in the most generalized forms (*Bombyx*, *Cicinnus*)." Thus the two subdivisions really represent two distinct lines of descent which separated far back in the history of the races, and are not simply arbitrary groups based on the presence or absence of a single character, as has been understood by some authors.

The FRENULUM-CONSERVERS.—Among the frenulum-conservers we find moths with highly specialized antennæ From the very fact of their great development we might fairly expect to find considerable variation even in small groups; and such is the case. A feature which is characteristic of the whole group is the specialized condition of the chitinous surface of the clavola. The perpendicular planes on the surface are not everywhere continuous, and usually the general surface slopes up to the top of the plane on one side and presents an appearance such as is represented in Figs. 37 or 33. In the filiform antennæ of each family there is not so much difficulty in finding characteristic structures, but when the highly pectinate forms are studied the problem becomes more difficult. The greatest variation occurs among the Geometrina. There we find some forms scarcely more specialized than many of the Microfrenatæ; and others, as highly specialized as any of the Frenulum-conservers. The following table will serve to separate the antennæ of this group

as far as I have been able to study them, and, unless it be among some of the Geometrina, I believe it will be found to hold for all the forms of our fauna. In order to serve for both filiform and pectinate antennæ, the table has to be practically double. Many characters which would be practicable for separation of filiform antennæ, either become obliterated or are seen with such difficulty when the forms become pectinate, that other separation characters must be found. In many cases also, two forms may be very unlike in appearance and even in structure, but at the same time be very difficult to distinguish by means of a description. The following table is constructed for the classification of the antennæ of males, but in most cases it will serve for the females also. The characters used are selected because they are what seemed the best recognition characters and not because they best represent the most essential differences in structural features.

## THE FRENULUM-CONSERVERS.

A. Hairs of second type absent, or but little developed.
  B. Antenna filiform.
    C. Hairs of third type absent; or, if present, with no definite arrangement
      D. Cones large and on many segments.
        E. Scape large, twice the diameter of pedicel...CYMATOPHORIDÆ.
        EE. Scape small, but little larger than pedicel.....GEOMETRINA.
      DD. Cones small, and on few segments.....THYRIDIDÆ.
    CC. Hairs of third type inserted regularly.
      D. In a single row along the distal and proximal edges of ventral expansion.....GEOMETRINA.
      DD. In a semicircle opening ventrad (see Figs. 46 and 50).
        E. Ventral expansions shortening ventrad, not equal to the segment in length.....NOTODONTIDÆ.
        EE. Ventral expansion not shortening ventrad, equal to the segment in length, so as to cause the end of the clavola to be recurved. SPHINGIDÆ
  BB. Antenna pectinate.
    C. Ventral expansion of the segment very large, extending ventrad of the bases of the pectinations.....SPHINGIDÆ.
    CC. Ventral expansion not extending far ventrad of the bases of the pectinations.
      D. Single hair of second type near middle of dorsal aspect of pectinations of the cephalic side.....DREPANIDÆ.
      DD. Without hair of second type as in D.
        E. Cones on ventral aspect of shaft, not on pectinations.
          F. Pectinations on distal half of segment.....GEOMETRINA.
          FF. Pectinations on proximal half of segments.....DIOPTIDÆ.
        EE. Cones at apex of pectinations, or beginning a migration out upon them.
          F. Clavola pectinate to distal end.....NOTODONTIDÆ.
          FF. Clavola filiform at distal end.....GEOMETRINA.

AA. Hairs of second type present and well developed.
  B. Antenna filiform.
    C. Hairs of third type absent.
      D. Some hairs of second type on ventro-distal edge of segments. GEOMETRINA.
      DD. Hairs of second type not present as in D.....AGARISTIDÆ.
    CC. Hairs of third type present.
      D. Hairs of third type without definite arrangement.
        E. Hairs nearly straight, segments of usual shape.....ARCTIIDÆ.
        EE. Hairs strongly curved, segments swollen, almost subglobose. LITHOSIIDÆ.
      DD. Hairs of third type inserted in rows, usually on the compressed ventral expansion in a semicircle opening ventrad.
        E. Ventral expansion narrow and slightly compressed. GEOMETRINA.
        EE. Ventral expansion large and usually compressed....NOCTUIDÆ.
  BB. Antenna pectinate.
    C. Pectinations relatively short.
      D. Scape large, twice the diameter of pedicel.....NOCTUIDÆ.
      DD. Scape small, little larger in diameter than pedicel....ZYGÆNIDÆ.
    CC. Pectinations long and well developed.
      D. Cones small, or apparently wanting.....PERICOPIDÆ.
      DD. Cones easily seen.
        E. Cones on shaft, or, if on pectinations, the latter have a single, strong hair of second type directly at the apex.
          F. Pectinations of cephalic and caudal sides subequal. GEOMETRINA.
          FF. Pectinations of caudal side longer.....ARCTIIDÆ.
        EE. Cones on pectinations, the latter with two strong hairs of second type at the apex.
          F. Cones very short.....ZYGÆNIDÆ.
          FF. Cones large.....LYMANTRIIDÆ.

The extent of my study and the limits of this thesis will not permit me to discuss each family of the Frenulum-conservers, but certain features are especially worthy of note. The evidences presented by antennal structures which might point to some relationships different from those shown in the classification of Professor Comstock are as follows: The antennæ of the Cymatophoridæ and the Thyrididæ seem to be closely related, and neither of them are widely separated from the higher forms of the Pyralidina. The antennæ, therefore, would seem to indicate a lower position for these families than that now assigned them. The antennæ of the Dioptidæ are very close to those of the Notodontidæ. The pectinations are more highly developed in the former, but the cones have not even begun to migrate along the pectinations. Instead of that, they are situated upon slight ventral elevations of the segments between and a little cephalad of the bases of the pectinations. In the Notodontidæ, the

cones have begun to migrate as in *Nerice bidentata*, where they have only reached a point near the bases of the pectinations, or they have already reached the apex as in *Cerura cinerea*, or *Icthyura inclusa*. The antennæ of the Noctuidæ, Lymantriidæ, Agaristidæ and Pericopidæ, are very similar in structure. There is a closer relation between the Noctuidæ and the Agaristidæ and between the Lymantriidæ and the Pericopidæ than exists in any other arrangement of the families. The Pericopidæ also present many points of resemblance to the Zygænidæ, especially to the more generalized forms. The Zygænidæ, however, seem to be most closely related to the Pyromorphidæ among the Generalized Frenatæ. Without any doubt, they belong where they are placed, high up among the Frenulum-conservers; therefore, I believe they are the ends of the branch, which, at an earlier time, gave rise to the Pyromorphidæ. Certain of the Deltoid Noctuids exhibit a strong resemblance to the Pyralids. They are of a higher type of structure however. One group, including *Herminia*, *Pityolita*, *Zauclognatha*, *Renia*, etc., have a peculiar modification near the middle of the clavola, which at once suggests the condition of things in *Desmia funeralis*. In *Herminia morbidalis* there are simply a couple of spurs on the ventral part of a segment. The greatest development is reached in *Renia restrictalis*. Fig. 28 represents this highly specialized organ in this species. The antennæ of the Sphingidæ resemble, in some features, those of the Notodontidæ and the Noctuidæ, but they are probably most closely related genetically to the Sesiidæ, and are representatives of a later development from the same branch. The Sphinx antenna shows as high a degree of specialization in certain directions as any of the moths. The Saturniina have more complicated pectinations, but that kind of a development is particularly adapted to their conditions of life. Among the swiftly flying Sphinxes such antennæ would be unwieldy and very liable to injury. Here we find a specialization much better fitted for habits of swift flight. Instead of long and numerous pectinations, we find greatly developed ventral expansions. The antenna of *Daremma undulosa* is a good example of the type; Fig. 46 represents one of the segments of the clavola. The scape is short and very stout; the pedicel also is short and stout, and is especially well supplied with the peculiar sense apparatus common to all forms; the clavola is large, and its shaft is heavier than in any other Lepidoptera; it is well protected by an abundance of scales on the

dorsal aspect, and it bears on its ventral aspect wide expansions, considerably compressed. These have hairs of the third type arranged on their sides in a semicircle with its opening directed ventrad. Within the semicircle is an abundance of pits and rods. The ventral expansions are as long as the segments which bear them, and near the apex of the clavola, where the shaft is smaller in diameter, they cause it to be more or less recurved, as we find it among the Hesperiina. In some of the pectinate forms, *e. g.*, *Smerinthus geminatus*, the ventral expansions are well developed and extend far ventrad of the bases of the pectinations. Such forms are found among those members of the group which are not so swift in flight as the other Sphingidæ.

The evidence of the antennæ in all these cases just noted is neither clear enough nor strong enough in itself to warrant any change in the classification, but it may suggest the direction of work on other organs. For the relationships of the larger groups, I do not believe the antennæ furnish as good guides as do other organs. For, while they are subject to great variation by reason of the peculiar habits and environment of the particular genus or species, they do not afford a sufficiently large basis for variation to leave a stable and constant ground-work for the tracing out of the paths by which the specializations are brought about. In smaller groups they are of great value. The best example of this is perhaps to be seen among the Saturniina in the Frenulum-losers. They are often of value also when other organs seem to be constant in a number of forms, *e. g.*, in the Noctuidæ, Agaristidæ, Pericopidæ and Lymantriidæ, the wing structures are pretty constant, but the antennal structures show considerable variation and afford characters to distinguish the groups.

### The Frenulum-losers.

The Frenulum-losers include the Saturniina, Lacosomidæ, Lasiocampidæ among the moths, and the superfamilies Hesperiina and Papilionina comprising the skippers and butterflies. The following table will serve to separate the antennæ of the males of this group.

## THE FRENULUM-LOSERS.

A. Antenna pectinate.
  B. Pectinations ventral.
    C. Pectinations of at least the cephalic side not extending to the apex of the clavola ..... SATURNIINA.
    CC. Pectinations extending to the apex.

D. Pectinations scaled on dorsal aspect.....LACOSOMIDÆ.
DD. Pectinations not scaled.....LASIOCAMPIDÆ.
BB. Pectinations dorsal.....SATURNIINA.
AA. Antenna clavate or falcate.
B. Clavola usually prolonged beyond the club, segments with some ventral expansion, often causing a recurving of the clavola beyond the club.....HESPERIINA.
BB. Clavola not prolonged beyond the club, segments without appreciable ventral expansion.....PAPILIONINA.

The most generalized antenna of this group belongs to the family Lacosomidæ. It bears a close resemblance to the antenna of the Bombycidæ and the Lasiocampidæ. In all three families the pectinations are long and slender, and arise from the ventral aspect of the segments. They are abundantly supplied with hairs of the third type and have pits along the dorsal aspect, especially near the apex of the pectinations. In the Lacosomidæ the pectinations are scaled, and there are fewer pits along the dorsal aspect. A study of the antennæ alone would lead to the belief that the Bombycidæ were more closely related to the Lacosomidæ than to the other Saturniina. In fact, there is such a wide difference between the antennæ of the first and those of the last two families of the Saturniina, that the first family would not be placed in the same superfamily were the classification based on those organs. The superfamily as now constituted includes the Bombycidæ, Hemileucidæ, Citheroniidæ and Saturniidæ. The antennæ of the members of the group may be separated by the following table:

## SATURNIINA.

A. Pectinations ventral, single pair to a segment.....BOMBYCIDÆ.
AA. Pectinations dorsal.
B. Single pair to a segment.....HEMILEUCIDÆ.
BB. Two pairs to a segment.
C. Distal portion of clavola filiform.....CITHERONIIDÆ.
CC. Clavola pectinate throughout.....SATURNIIDÆ.

The Bombycidæ are the least specialized of the Saturnians, and probably represent a branch which long ago separated from the one that produced the other families. The pectinations are well developed, but they are ventral, and there is only a single pair to a segment. The pectinations are well supplied with hairs of the third type, and the shaft also bears them for the width of the space between the bases of the pectinations. A rather unexpected fact is that the antennæ of the female are nearly as well developed as those

of the males, while in most of the other Saturniina they are much less specialized.

The Hemileucidæ exhibit a line of development distinct from that of the Bombycidæ on the one hand in having the pectinations dorsal instead of ventral, and from the Citheroniidæ and Saturniidæ on the other in having a single pair of pectinations to a segment. Thus it appears that they belonged to the branch which produced the latter families after it had separated from the branch giving rise to the Bombycidæ.

The Citheroniidæ and the Saturniidæ have followed the same line of development in that they both have two pairs of dorsal pectinations to a segment. The first family has not progressed so far as the second; its members do not have their antennæ pectinate throughout. The antennæ of these families show a high degree of development also in the arrangement of the hairs of the third type. The spaces between the pectinations are nearly filled by long, interlacing hairs, which are regularly arranged in a distinct line of from two to three rows extending continuously from the apex of one pectination along the dorso-lateral surface of the segment to the apex of the other pectination of the same side. Fig. 54 represents the arrangement in *Dryocampa rubicunda*. Still another feature showing remarkable development of sense-organs is exhibited in the higher forms, especially in *Tropæa* and *Samia* of the Saturniidæ. This is the multiplication of cones. While in nearly all other moths cones are limited to one or at most two to a segment, we here find them literally heaped up on the ventro-distal edge of the segments of the distal portion of the antennæ; and on the pectinations also there are often several either at the apex or along the pectination at various intervals. Fig. 7 shows this condition in the antenna of *Tropæa luna*.

The family Saturniidæ is interesting in the series of form it presents. The genera *Coloradia*, *Automeris*, *Callosaturnia*, *Tropæa*, *Telea*, *Callosamia*, *Philosamia* and *Samia*, present a regular and progressive series. The following table will serve to separate the antennæ of the members of this family:

SATURNIIDÆ.

A. Antennæ of female with single pair of pectinations to a segment.
  B. Antennæ of male with distal pair of pectinations shorter than the proximal.
    C. Distal pair not more than half the length of the proximal...Coloradia.
    CC. Distal pair but little shorter.....Automeris.

BB. Antennæ of male with distal and proximal pairs of pectinations subequal. **Calosaturnia.**

AA. Antennæ of both sexes with two pairs of pectinations to a segment.

B. Proximal and distal pairs subequal in male, distal pair shorter in the female.

C. Distal pair of female very short, without hairs of the second type. **Telea.**

CC. Distal pair of moderate length with hairs of second type..... **Tropæa.**

BB. Proximal and distal pairs subequal in both sexes.*

C. Distal pair of pectinations of female shorter than, or only equal to, the proximal on the proximal segments.

D. Distal pair wanting in a few distal segments..... **Callosamia.**

DD. Distal pair present, at least in rudiments, to the distal end... **Samia.**

CC. Distal pair of pectinations of female longer than the proximal on the proximal segments..... **Philosamia.**

There is a gradual progression in complexity of development from *Coloradia* on the one hand, to *Samia* or *Philosamia* on the other. The females of *Coloradia*, *Automeris* and *Callosaturnia*, have a single pair of pectinations to a segment, while those of the other genera have two pairs. The males of the first two genera have the distal pair shorter, while the other have the two pairs subequal. There is also a gradual increase in both sexes from one end of the series to the other in the number and position of the cones. In *Samia* there is not only an abundance on the shaft, but many are on the pectinations of the distal portion of the clavola. There is some doubt as to whether *Samia* or *Philosamia* should be considered the higher form. The male *Samia* is more highly developed than the male *Philosamia;* but on the other hand, the female *Samia* is less developed than the female *Philosamia.* I believe that now *Samia* is the higher form, and that it has outstripped *Philosamia* in specialization in comparatively recent times. If the females lag behind the males, as seems most probable, the condition we find in the two genera would indicate that the male *Philosamia* has been long enough fixed to allow the female to approach it in specialization; while in *Samia* the male is even now progressing in complexity, and the female has not had time to approach it in development. There are many indications in the antennæ of *Samia* which point to its recent or even present progress. The pectinations are not well established in form and position; the cones are variable in position; even the segmentation is more or less indefinite in portions of the clavola.

* The genus *Saturnia* belongs somewhere in this section. It is represented in the United States by a single rare species, *S. galbina*, and no specimen is at hand for study. The descriptions of the insect are too indefinite on points relating to the antennæ to be of any value, and it is necessary, therefore, to omit this genus from the table.

The Hesperiina and Papilionina are widely separated from the other Lepidoptera. The antennæ show that they, with the other Frenatæ, probably branched off from the Jugatæ very early. The character of the chitinous surface of the clavola allies them to the Frenatæ and at the same time the absence of cones in all forms shows that they branched off from the other Frenatæ before the origin of those organs. That the cones have been present, and have subsequently disappeared in all skippers and butterflies, is scarcely conceivable; that these organs have originated many times in the other Frenatæ is equally difficult to believe; we must conclude, therefore, that the cones originated early in the history of the Frenatæ, but that the Hesperiina and Papilionina separated from the Frenate stem before that origin. It is certain also that the Hesperiina and Papilionina separated from a stem-form common to the two. The ventral expansion producing the hook in so many members of the former superfamily is probably a development brought about after the separation took place. Most forms of the Hesperiina have a less abrupt club than do the butterflies. The clavola thickens more gradually from the proximal end, and it is often produced in a tapering point at the apex beyond the club proper. In most other respects the antennæ of the two forms present many common characters. The Hesperiid antenna is not so highly developed as those of the other superfamily. Both in the organs they possess and in the structure of the whole antenna, they exhibit a lower degree of specialization. The antennæ are inserted far apart, while in the Papilionina they are nearer together. The recurved hook so characteristic in such forms as *Epargyreus tityrus*, Fig. 4, our most common large skipper, does not occur in all forms. *Megathymus yuccæ*, another skipper of about the same size, but belonging to another family, lacks the hook, and there is only a slight curving of the end of the clavola, not more than is seen in some of the butterflies. In such forms, however, the ventral expansion is a feature which distinguishes them from the Papilionina.

The Papilionina includes the Papilionidæ, Pieridæ, Lycænidæ and Nymphalidæ. The Papilioninæ represents one line resulting from a dichotomous division of the stem-form of the Papilionina, and the three other families represent the other. The members of the subfamily Papilioninæ have developed a type of antenna quite different in some respects from that of the other forms. This confirms one of the most important changes made in the older classifications by

that of Professor Comstock--the separation of the Pieridæ from the Papilionidæ and association of them with the Nymphalidæ and Lycænidæ, while the Papilionidæ are left standing alone, except for the few almost archaic forms representing the Parnassians. Instead of scales and pits along the clavola as in the Nymphalidæ, or scales alone as in most of the members of the other families, there are in the Papilioninæ no scales distad of the first segment of the clavola, but there is an abundance of short hairs or rods which no doubt serve as sense organs, and possibly serve to compensate for the scarcity of well-developed pits of the usual type. The sense organs are scattered over the whole surface of the clavola with considerable regularity, and the lack of scales is doubtless due to their large development. In the Parnassiinæ we find the same short hairs or rods, but instead of extending over the whole surface of the clavola, they are confined to a more limited area along the distal portion. The Parnassians are doubtless nearer the stem form of the Papilionina than are the Papilioninæ. There are only four species, comprising a single genus, in the fauna of North America, and from their general structure they are regarded as a not very highly developed group. They have a thick covering of scales over the clavola, at least on the dorsal aspect, but the presence of the short hairs allies them to the Papilioninæ and separates them from the other families of butterflies. The antennæ of the Papilionidæ, then, indicate that they are distinct from the other butterflies, and that they are less highly specialized.

I am unable to find any definite characters in the antennæ themselves which are constant for the separate families, and which will separate the Pieridæ, Lycænidæ and Nymphalidæ. The Pieridæ, however, differ from the Lycænidæ in the insertion of their antennæ. In the former the antennæ do not infringe upon the eyes, while in the latter family, at least, the sockets do encroach upon the eyes. The Nymphalidæ have the most highly organized antennæ of all the butterflies. They are abundantly supplied with well-developed pits. The clavola has pits upon the ventral surface even to the proximal segment in some forms, and there are other indications that these forms express the highest antennal development among the butterflies.

It would perhaps be futile to compare the antennæ of the skippers and butterflies with those of the moths. There is a wide difference between the structure and the organs of the antennæ of two such

extreme forms as *Samia cecropia* and *Euvanessa antiopa*, but that each is best adapted to the other structures and to the life habits of the possessor, and is most efficient in supplying the needs of its existence, is perhaps unquestioned. *Samia cecropia* is chiefly nocturnal; even in closely allied diurnal forms, such as *Callosamia promethea*, vision appears to be of little service as a guide to the motion of the moth; and in such forms we find a higher degree of development in pectinations which bear an abundance of long sense-hairs of the third type. *Euvanessa* and the skippers and butterflies in general appear to have excellent vision, and in no case do they have pectinations or sense-hairs of the third type. The pits and rods, however, which are common to all families of the Lepidoptera, reach a higher development in *Euvanessa* than in *Samia*. We may assert, then, with a fair degree of confidence that the antennæ of the butterflies are more limited in their functions, but that within the limits of their scope they are more efficient.

## SUMMARY.

The character of the subject of this thesis makes it difficult to summarize the results of the work. The more important features, however, may be noticed under the following numbers:

1. Muscles in the head move the scape; muscles in the scape move the pedicel; distad of the scape no muscles have been demonstrated, and the clavola is therefore capable of motion in itself only when acted upon by some external force causing a flexure and a subsequent extension.

2. Besides organs for protection, there are at least six types of sense organs situated in the antennæ, and all but one are developed from a simple sense-hair inserted at the ectal end of a pore-canal through which it is connected with a multinuclear sense-cell.

3. The antennæ doubtless function as sense organs of touch, smell and hearing, although those senses are not subject to the same limitations as in the higher animals and may be considerably different in their range of perception.

4. The antennæ show that all Lepidoptera are descended from one primitive stem form, of which we may predicate the more essential features of structure.

5. The evolution of ventral expansions, of pectinations, of the chitinous surface, of the sense organs shows an increasing differentiation of structure following the demand for increasing specialization of function.

6. In the more essential features, the evidence of the antennæ of all the families of the Lepidoptera confirms the provisional classification based upon the wing structures, though in a number of cases it indicated a change in the relationships of some of the families. These are indicated in the chapter on the discussion of the families.

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## CONCLUSION.

The work carried on upon the antennæ of the Lepidoptera proves that these organs are worthy of more extended study. Aside from the great interest which attaches to them as the most specialized sense organs, their value as records of the descent of families is very considerable in taxonomic work. In the determination of the relationships of the larger groups, they do not furnish as good guides as some of the larger organs, for while they are subject to great variation, they do not afford a sufficiently large basis for variation to leave a stable and constant ground-work for the tracing out of the paths by which the specializations are brought about. As supplementing the evidence of the wings they are valuable. This thesis has dealt only with the relationships of families and superfamilies, but there is a large field for work within these groups, and in many cases the antennæ will be found most important in taxonomic work. Owing to the difficulty of observation and the necessity for especial preparation, they afford few characters which would be practicable for recognition characters in ordinary systematic work, but for the more careful and painstaking work of the study of relationships they are of great value.

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## DESCRIPTION OF FIGURES.

The figures were drawn by the author with a camera lucida and a Leitz microscope, and a scale from a Ewell stage micrometer was drawn by the side of the figure. All side views are placed on the page with the distal end towards the left. The same reference figures and numbers are used throughout.

### *Reference Figures and Numbers.*

1.—Sense-hair of first type.
2.—Sense-hair of second type.
3.—Sense-hair of third type.
4.—Pit and rod.
5.—Cone.
6.—"Johnston's Organ."
ac.—axis-cylinder.
c.—sense-cell.
c. e.—compound eye.
ch.—chitin.
cl.—clypeus.
d. c.—dermal cell.
ep.—epicranium.
ge.—gena.
l.—labrum.
m.—muscle.
md.—mandible.
me.—membrane.
mx.—maxilla.
n.—nerve.
n. tr.—nerve-trunk.
oc.—occiput.
p.—pedicel.
pf.—pilifer.
pg.—postgena.
pl.—palpi.
r.—rod.
sc.—scale.
sc. c.—scale-cup.
sce.—scape.
su.—clypeal suture.

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# NEW NORTH AMERICAN SPIDERS AND MITES.

BY NATHAN BANKS.

## OONOPIDÆ.

But one species of this family has been described from our country, *Orchestina saltitans* Bks., a soft-bodied form. I now take pleasure in adding another species of the hard-bodied section.

**Gamasomorpha floridana** nov. sp.—Length 2. mm. Reddish yellow, legs paler yellowish; cephalothorax once and a third as long as broad, narrow in front, surface punctulate except in median region, which is bounded by a row of bristles, quite high in second third, convexly sloping to low clypeus, abrupt behind; a. m. e. touching the slightly smaller p. s. e.; p. m. e. larger, touching, but well separated from s. e.; posterior row distinctly recurved; mandibles vertical, with a swelling on the front near base; maxillæ inclined over the short lip; sternum a little longer than broad, broadly truncate between hind coxæ, punctulate, a bristle arising from each puncture; legs moderate, femora thickened at base, no spines. Abdomen elliptical, once and a half as long as broad, wholly covered above by a horny shield, and a large one on the venter from base to near spinnerets, a circle at base of spinnerets, shields punctulate, each puncture giving rise to a hair, ventral shield divided at lung-slits, and in the anterior portion are two oblong red marks.

Two specimens from Punta Gorda, Fla. (Mrs. Slosson).

## PHOLCIDÆ.

### PHOLCOPHORA nov. gen.

Group of Pholceæ. Eight eyes; posterior row moderately recurved, of about equal size, the m. e. their diameter apart, almost touching the s. e.; anterior row procured, the m. e. but little smaller than the s. e., nearly contiguous, and but little farther from either the a. s. e. or the p. m. e., but a trifle nearer to the former; cephalothorax broad, impressed, the pars cephalica slightly elevated and rounded, eyes not on an elevation.

Closely related to *Physocyclus*, but in that genus the posterior row of eyes is straight, and the a. m. e. several times nearer to the a. s. e. than to the p. m. e.

**Pholcophora americana** nov. sp.—Length 2.2 mm., femur i 1.8 mm. Cephalothorax pale yellowish, darker on head, black spots around eyes; sternum and legs pale dirty yellowish. Abdomen pale beneath, dark gray above; everywhere with scattered granules, but most numerous on the abdomen, each giving

rise to a large, stiff, curved bristle; cephalothorax as long as broad, rounded, low, head elevated, clypeus high and concave, eyes large and close together; mandibles moderately large, in ♂ with a down-curved spine from inner edge of base, the two, as seen from above, close together and not diverging. Legs long and slender, metatarsus i about three times as long as tarsus i; sternum as broad as long, sides rounded, broadly rounded behind, in the ♂ there is a conical hump on each anterior corner. Abdomen higher than long, somewhat compressed; region of epigynum swollen, a large brown plate, concave behind and each side extending backward to the furrow. The ♂ palpus with the femur swollen at tip; the patella short; the tibia gibbose above; base of tarsus short, with a slender projection on the outer side, bulb rounded, as large as tibia, higher than long, on inner side near tip is a darker lunate body, tube stout, shorter than bulb, oblique at tip, its lower edge projecting.

Ft. Collins, Colorado, in a house (Mrs. Ninette Baker).

## ŒCOBIIDÆ.

**Thalamia floridana** n. sp.—Length ♀ 2 mm. Cephalothorax pale grayish, blackish on edges. Abdomen grayish, blackish on sides, no silvery spots, venter pale. Legs grayish, the femora show a blackish spot in middle of underside; sternum and coxæ pale yellowish; structure similar to *T. parietalis*, but the legs are a little shorter and stouter; the epigynum consists of two small connivent holes on posterior margin and a bifid median furrow in front.

Lake Worth, Florida (Mrs. A. T. Slosson). Readily separated from *T. parietalis* by its nearly uniform gray color and shape of epigynum.

## DRASSIDÆ.

**Micaria punctata** nov. sp.—Length ♀ 2 mm. Cephalothorax blackish, basal joint of palpus black, rest white; femora of anterior legs black, rest of these pairs white (posterior pairs missing); sternum pale yellowish. Abdomen black above, on basal half four white spots forming a square, and on median line two elongate white spots; on posterior half there is a row each side of three small white spots; on the lower sides there is an oblique white spot near base, and another near middle, venter pale; cephalothorax short and broad, anterior row of eyes nearly straight, a. m. e. fully their diameter apart, closer to the equal a. s. e.; posterior row barely procurved, p. m. e. more than diameter apart, oblique, hardly their diameter from the equal p. s. e.; sternum very broad, sides rounded, pointed between the hind coxæ. Legs moderately short, with some scattered hairs, no spines, femur i about as long as width of cephalothorax. Abdomen twice as long as broad, not constricted, broadest near middle, tapering and pointed behind, covered above with blackish, somewhat iridescent scales; the epigynum consists of two openings about twice as long as broad, constricted in the middle, leaving a septum between them about as broad as their short diameter.

One specimen, Punta Gorda, Florida (Mrs. A. T. Slosson). Our smallest species.

**Micaria coloradensis** nov. sp.—Length ♂ 4 mm.; ceph. 1.6 mm. long, 1 mm. broad; a ♀ is 3 mm. long. Cephalothorax, sternum and legs light brown-

ish yellow, without markings, except the metatarsi, which are infuscated. Abdomen black above, paler below, clothed with greenish iridescent scales, a narrow white band before the middle; cephalothorax narrow; anterior row of eyes short, a. m. e. about their diameter apart, nearer to the a. s. e.; posterior row longer, the p. m. e. fully their diameter apart, scarcely so far from the p. s. e.; sternum a little longer than broad, pointed behind, sides rounded. Abdomen one and two-thirds longer than broad, widest at middle, a hard spot at base, not constricted; the ♂ palpus is similar to *M. constricta*, but the tibia is shorter, the projection on the outerside very much larger and stouter, being nearly as long as the width of the joint, the palpal organ has the tube longer than in *M. constricta*, the inner tube shows as in that species, and there is a hook in the same position; on the tarsus near the tip of the tube are three very stout black spines: the epigynum consists of a somewhat quadrangular cavity with rounded corners, broader behind than long, and divided by a narrow septum: in the bottom the anterior darker portion is obliquely separated from the smaller posterior portion.

Ft. Collins, Colorado (Mrs. Ninette Baker). One male has the cephalothorax and sternum wholly infuscated.

**Micaria perfecta** nov. sp.—Length 2.8 mm.; ceph. 1.2 mm. long, .85 mm. wide. Cephalothorax dark brown, clothed with white hairs; femora i and ii black, rest of legs pale yellowish; sternum blackish. Abdomen black, clothed with iridescent scales, a band at base and a narrow one before the middle, white; a. m. e. hardly their diameter apart, close to a. s. e.; p. m. e. about their diameter apart, nearer to p. s. e. Legs moderately short, femora stout: sternum plainly longer than broad, tapering and pointed behind; abdomen over one and a half times longer than broad, cylindrical, not constricted, and without a hard spot at base; the ♂ palpus has the tibia but little longer than broad, and with a short stout projection on the outer tip; tarsus slender, bulb short, very convex, conically swollen in lower part, a large prominent hook above, the tube short and on the inner side, not at tip of bulb.

Ft. Collins, Colorado (Mrs. Ninette Baker).

**Micaria palliditarsus** nov. sp.—Length 4.6 mm.; ceph. 1.9 mm. long; tibia, plus patella iv, 2.05 mm. Cephalothorax yellow, blackish near base, mandibles and sternum yellow; first pair of legs wanting, other femora brownish or blackish, rest of leg ii pale, patellæ of iii and iv pale, lineated with black, tibia and metatarsus iii brownish, tibia and metatarsus iv black, tarsi iii and iv pale. Abdomen black, covered with scales having a greenish reflection; a band of white scales just before the middle, narrowly interrupted above, broadly below. Head of cephalothorax narrower than in *M. longipes;* sternum long, pointed behind; abdomen a little constricted just before middle; the legs are very slender, there are several spines under tibia ii; p. m. e. barely once their diameter from the p. s. e.; more than twice that distance from each other.

One specimen (♀), Southern California.

Our species of *Micaria* may be separated by the following table:

1. Abdomen not constricted.....2.
   Abdomen constricted.....5.
2. Abdomen with several small white spots above.....**punctata.**
   No small spots above.....3.

3. Anterior femora darker than rest of legs, especially in the male.....4.
   Anterior femora paler than anterior metatarsi and tarsi....**coloradensis.**
4. Cephalothorax brown, ♂ palpal bulb conically swollen at base...**perfecta.**
   Cephalothorax paler, ♂ palpal bulb not swollen at base.....**montana.**
5. Body pale, covered with golden scales, legs almost wholly white.....**agilis.**
   Body dark, with dark scales, legs dark.....6.
6. P. M. E. less than diameter apart, no lines on the legs.....**constricta.**
   P. M. E. fully their diameter apart, legs lined.....7.
7. P. M. E. not once their diameter from p. s. e.....**palliditarsus.**
   P. M. E. much more than their diameter from p. s. e.....8.
8. Cephalothorax pale yellow-brown.....**longipes.**
   Cephalothorax dark brown.....**formicoides.**

**Eilica bicolor** nov. sp.—Length 3.5 mm. Cephalothorax and legs reddish, the former blackish on the margin; legs more yellowish; abdomen black, sternum pale yellowish: cephalothorax nearly once and a half longer than broad, low, clothed with scattered black hairs, some longer ones on clypeus; anterior row of eyes about straight; a. m. e. less than their diameter apart, still closer to the very much larger a. s. e.; posterior row slightly longer than anterior one, distinctly recurved, the p. m. e. fully their diameter apart, closer to the slightly larger p. s. e.; m. e. equal, forming a quadrangle as high as broad behind; mandibles quite large and stout, slightly porrect, a broad tooth below. Legs moderate. patella plus tibia i shorter than cephalothorax. spines above on femora and some below on tibiæ and metatarsi, tarsi about as long as metatarsi; sternum oval, pointed behind between hind coxæ. Abdomen once and a half longer than broad, broadest behind the middle, depressed, slightly truncate at base, broadly rounded behind; the ♂ palpus has a prominent curved spine at outer tip of tibia, the palpal organ is divided obliquely into two lobes, the lower one bearing a short, stout, curved hook, from the tip arises the slender tube, it is twisted at base, then makes one nearly complete circle as large as the palpal organ.

One male, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Callilepis pluto** nov. sp.—Length 5.5 mm.; ceph. 2.4 mm. long, 1.8 mm. wide; tibia, plus patella i, 1.9 mm.; tibia, plus patella iv, 2.6 mm. Cephalothorax dark red-brown, nearly black, lineated with black; mandibles, palpi and legs similar, tarsi of legs paler; sternum nearly black. Abdomen black, spinnerets dark red-brown; abdomen with yellowish hair above; a. m. e. separated by more than their diameter, and much closer to the larger a. s. e.; posterior row recurved, no longer than the anterior row, from which it is widely separated; p. m. e. oval, about their diameter apart, not quite so far from the larger p. s. e.; mandibles with a plate beneath the fang; sternum nearly as broad as long. Legs quite bristly, tibia i with five spines beneath, tibia iv with one spine above near the base. Abdomen depressed, once and a half longer than broad, rounded at base; the epigynum is broader than long, semicircular in outline, from the posterior margin there extends forward on each side a narrow, curved, pointed piece, reaching nearly to front margin, leaving on each outer side a slender channel, and in the middle between the two pieces a large cavity, which is almost filled by a pear-shaped body.

One female, Olympia, Washington (Trevor Kincaid). This species, at first sight, resembles *Prosthesima atra* Htz., but is readily separated by the structural characters.

**Gnaphosa americana** nov. sp.—Length 7.7 mm.; ceph. 3.4 mm. long, 2.3 mm. wide. Cephalothorax yellow-brown, with black on the ends of the radial furrows and just behind the pars cephalica; mandibles red-brown; legs, palpi and sternum yellow-brown. Legs darker on the tibiæ and metatarsi. Abdomen black, spinnerets brown; cephalothorax longer than tibia and patella i; both tibiæ i and ii have two spines beneath at tip, no others; posterior rows of eyes strongly recurved, p. m. e. about their diameter apart, and nearly three times that distance from the larger p. s. e.: sternum plainly longer than broad, truncate in front, broadest at coxæ ii, pointed behind. Abdomen depressed, truncate at base, with a fringe of stiff hairs, once and a third longer than broad; the cavity of the epigynum is divided into two parts; the anterior part is once and a fourth longer than broad, truncate in front and connected behind to the very much narrower posterior part, which is about twice as long as wide; the anterior part contains a large oval body, pointed in front, and, filling the cavity behind, it extends into and fills the posterior cavity; in its middle there is a somewhat triangular mark; behind the epigynum there is a parted line as in the other species.

One specimen, Ithaca, N. Y.; its small size and shape of epigynum readily distinguishes this from the other species of the genus.

**Gnaphosa parvula** nov. sp.—Length 5.4 mm.; ceph. 2.5 mm. long, 1.9 mm. wide. Cephalothorax yellow-brown with black marks on radial furrows, and a black V at end of pars cephalica; mandibles red-brown; femora, especially the anterior pairs, quite yellow; posterior femora more blackish, rest of legs tinged with red-brown; palpi yellowish; sternum and abdomen black, spinnerets pale; cephalothorax longer than tibia, plus patella i, quite narrow in front; p. m. e. less than their diameter apart, hardly twice their diameter from the larger p. s. e.; tibiæ i and ii without spines; sternum nearly oval, but truncate at base. Abdomen depressed, truncate at base, one and one-third times longer than broad; the epigynum is nearest to *G. brumalis*, but the middle finger is not pointed at tip, but blunt; it is shorter and divided by a transverse line; there is no basal striate body as in that species, but a rather broad plate containing a small rounded cavity in its posterior margin; the usual parted line behind the epigynum; the ♂ palpus has a spur on the outer side of tibia, the palpal organ has hard plates at base as in *G. brumalis*, but the tube is longer, though not so long as in *G. conspersa*, and the hook is stouter even than in the latter species.

A female, Hanover, N. H. (C. M. Weed); a male, Franconia, N. H. (Mrs. A. T. Slosson). Its small size, black sternum and peculiar epigynum, distinguish it from the other species.

**Prosthesima floridana** nov. sp.—Length ♀ 6.5 mm.; ceph. 2.3 mm. long, 1.8 mm. broad, patella, plus tibia i, 2 mm. long. Cephalothorax yellowish; legs paler yellowish, except tibiæ, metatarsi and tarsi of anterior pairs, which are red-brown; mandibles red-brown; sternum yellowish. Abdomen pale whitish gray; everywhere clothed with fine blackish hair and stouter bristles; cephalothorax long and low: a. m. e. larger than other eyes, less than one-half their diameter apart, and still closer to the a. s. e.; posterior row slightly longer than the anterior one, and plainly procured; p. m. e. oval, oblique, about their diameter apart, scarcely so far from the p. s. e.; quadrangle of m. e. fully as long as

broad in front; mandibles quite large, distinctly porrect, fangs long; sternum slender, narrowed in front and behind. Legs short and stout, metatarsi and tarsi i and ii with scopulas, two spines below on tibia i and same on tibia ii, many below and on sides of the posterior pairs; abdomen depressed, once and a half longer than broad, truncate at base; the epigynum consists of a somewhat triangular cavity, nearly twice as broad as long, divided by a narrow septum.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Prosthesima niger** nov. sp.—Length 6-8 mm.; ceph. 2.2 mm. long, 1.7 mm. wide; patella, plus tibia iv, 3 mm. long. Cephalothorax, mandibles and sternum dark red-brown. Legs blackish, yellow on coxæ, tarsi and base of femora. Abdomen dark gray; posterior row of eyes straight, barely longer than anterior row; p. m. e. large, oval, not half their diameter apart, about their diameter from the smaller p. s. e.; sternum longer than broad, truncate in front, widest at second coxæ, sides rounded, pointed behind; the legs are very hairy; there are no spines above on tibiæ iii or iv, and none below on tibia i. Abdomen quite long and somewhat cylindrical, but slightly depressed; the epigynum consists of a cavity about as broad as long, widest in the middle and narrowed each end; in front is a broad plate, concave behind, from this extends backward a large clavate septum whose posterior tip rests in an extension of the main cavity.

Three specimens, Olympia, Washington (Trevor Kincaid). Differs from *P. atra* in the paler color, the oval p. m. e., the longer hind legs, and in different epigynum.

**Prosthesima valida** nov. sp.—Length ♀ 9 mm.: ceph. 3.8 mm. long, 2.5 mm. wide; patella, plus tibia iv, 4.1 mm. Cephalothorax, mandibles, legs and palpi red-brown: legs darker on metatarsi and tarsi; sternum dark red-brown; abdomen above and below dark gray, nearly black in front and blackish on the sides; spinnerets yellowish. Body and legs with black hairs. Legs quite slender, with scopulas to tarsi and metatarsi (except iv), three spines below on tibia i, and one above on tibia iv; posterior row of eyes straight, barely broader than anterior row; p. m. e. round, separated by their diameter, nearer to each other than to p. s. e.; a. m. e. largest eyes, separated by nearly their diameter, half that distance from the a. s. e.; the epigynum consists of a cavity longer than broad, divided by a septum, the anterior half of the cavity being covered by a thin plate. What I take to be the male of this species is smaller and paler; 7. mm. long; the cephalothorax and legs yellowish, the abdomen nearly white, with a triangular corneous plate at base above; there are two rows of three spines each under tibia i, and one spine above on tibiæ iii and iv; the tibia of the ♂ palpus is much broader than long, on the outer side is a curved projection ending in two sharp points; the tarsus is more than twice as long as broad; there is a dark process along the outer side, and a dark line on half the inner side; the tube is very small and short, terminating the oblong bulb; at the tip there is a swollen white portion.

Los Angeles, Cala. (Dr. A. Davidson).

**Drassus vastus** nov. sp. - Length ♀ 11 mm.; ceph. 4.6 mm. long, 3 mm. wide; patella, plus tibia iv, 5.2 mm. Cephalothorax and legs yellowish, with a tinge of brown, metatarsi and tarsi blackish, mandibles reddish, sternum yellow-brown; abdomen grayish brown, darker near tip, with several faint light chev-

rons on the posterior part of dorsum; everywhere densely hairy. Legs 4-1-2-3, metatarsi (except iv) and tarsi with dense scopulas; no spines above on any of the tibiæ, one spine below on tibia i; posterior row of eyes procurved, longer than the anterior; p. m. e. oval, more than their diameter apart, slightly nearer to each other than to p. s. e.; anterior row straight; a. m. e. the larger and nearer to a. s. e. than to each other; sternum broad, the epigynum consists of a somewhat circular cavity, from the anterior edge of which there projects a large plate emarginate on its posterior border.

Olympia, Wash. (Trevor Kincaid).

**Drassus placidus** nov. sp.—Length ♀ 7. mm.; ceph. 2.5 mm. long, 1.9 mm. wide; patella, plus tibia iv, 2.5 mm. Cephalothorax and legs pale yellow-brown, blackish around eyes; mandibles dark red-brown; sternum yellow-brown, darker on edges; abdomen above and below gray; posterior row of eyes procurved; p. m. e. large, oval, close together, very far from s. e.; a. m. e. separated by nearly their diameter, closer to the s. e. than to each other. Legs short, quite hairy, but with few spines, none on any of the tibiæ, scopulas on tarsi very thin; sternum moderately broad; epigynum consists of a cavity broader than long, containing a large plate, the posterior end of which has a small projection to the posterior margin of the cavity.

Ames, Iowa (Prof. C. P. Gillette).

## CLUBIONIDÆ.

**Anyphæna floridana** nov. sp.—Length ♀ 8 mm.; ceph. 3 mm. long; patella, plus tibia iv, 3.2 mm. Cephalothorax pale yellowish, darker around eye-region, legs similar, metatarsi and tarsi of anterior pairs darker; mandibles red-brown; sternum pale, abdomen whitish; a. m. e. less than diameter apart, a little closer to the equal a. s. e.; p. m. e. once and a half their diameter apart, barely closer to the equal p. s. e.; mandibles large, scarcely porrect; sternum oval; legs moderate, 1-4-2-3; tibia, plus patella i, a little longer than those joints of leg iv, metatarsus iv no longer than i, all with many spines. Abdomen oval, ventral furrow much nearer to the epigynum than to spinnerets; the epigynum has a septum twice as long as long as broad, terminating behind in two black spots, on each anterior side an anteriorly pointed cavity.

One female, Lake Worth, Florida (Mrs. A. T. Slosson).

**Gayenna fraterna** nov. sp.—Very similar to *G. calcarata* Em.; the legs a trifle longer, the tarsus of ♂ palpus much longer, and the piece, which in *G. calcarata*, is broad and incurved at tip, is much more slender and only its fine tip incurved; the prominences on the coxæ are similar, but the bifid process of the third coxa of *calcarata* is here smaller, slender and simple, not bifid; the color is paler than in *calcarata*, and the spots and dots more scattered.

Two males; one Harbor Hill near Roslyn, N. Y., May; the other from Carpenter's Woods near Sea Cliff, N. Y., June.

**Gayenna pacifica** nov. sp.—Length ♀ 6 mm.; ceph. 2.4 mm. long, 1.8 mm. wide; patella, plus tibia iv, 2.3 mm. Cephalothorax brownish yellow, with an irregular brownish stripe each side connecting through the eye-region, the enclosed area is usually lineate with brown. Abdomen covered with brownish

lines and spots, more or less reddish in the interspaces; mandibles almost black; sternum yellow-brown: femora and patellæ pale brownish, with some black lines; tibiæ, metatarsi and bases of tarsi dark brown, tips of tarsi pale; young specimens are often suffused with red; cephalothorax broad and low; a. m. e. fully their diameter apart, much closer to a. s. e.; p. m. e. once and a half their diameter apart, scarcely so far from the p. s. e.; mandibles stout, vertical; sternum oval; abdomen once and two-thirds longer than broad, densely hairy, tracheal openings a little behind the middle of venter; the epigynum consists of an area longer than broad, broadest just behind the middle, anterior sides concave, posterior sides convex; it is indented from behind to near the middle, where there is a small circular cavity.

Olympia, Wash. (Trevor Kincaid).

**Gayenna maculata** nov. sp.—Length 4.4 mm. Cephalothorax yellowish, with a black dentated stripe each side, and a line behind each p. m. e. Abdomen whitish, with a large black spot each side at base, two converging rows of four very distinct and quite large spots, a large apical spot, and some small, scattered spots black; the sides mostly black; venter with a few black spots; two black lines on the mandibles. Legs yellowish, with some bands and black spots, sternum pale; similar to *A. celer*, but the ♂ palpus has the swelling on the tibia larger, and the projection of the tibia has the outer part much smaller, while the inner part is shaped differently, being longer, contracted in the middle and bilobed at tip; the tarsus is very similar, the central strip is more slender and recurved at tip, and the tube is longer.

One ♂, Washington, D. C., November.

I at first thought this was *A. celer* Hentz, but Hentz says that the spots on the abdomen are indistinct, which would agree with Keyserling's *incerta* rather than this species. Moreover, this species is probably quite rare, while *A. incerta* is very common.

**Clubiona mœsta** nov. sp.—Length 4-6 mm.; ceph. 2.2 mm. long, 1.7 mm. wide; patella, plus tibia iv, 2 mm. Cephalothorax pale yellowish, growing darker on the head, no marginal line; mandible dark red-brown; lip and maxillæ red-brown; sternum yellowish; legs pale; abdomen reddish or brownish, showing a faint basal spear-mark; venter whitish, epigynum black; cephalothorax clothed with white and black hairs and black bristles. Head moderately broad; all eyes about equal; a. m. e. about their diameter apart, barely so far from a. s. e.; p. m. e. over three times their diameter apart, over twice their diameter from p. s. e.; mandibles large and prominent; sternum oval, truncate in front. Legs moderately stout, only one spine beneath on tibia iii: the epigynum is an area broader behind than in front, the posterior margin sinuate, two large circular cavities about their diameter apart, the portion between them extends behind as a truncated lobe; the male palpus has a large, stout projection on the outer tip of tibia, truncate at the end; the tarsus is oblong, about twice as long as broad, truncate at tip, the tube is bent at a right angle and then curves back on the outer side, there is a broad middle plate, truncate at tip, with a small black cone at each corner.

Several specimens, Chicago, Ill., October; also Ft. Collins, Colo., May (Mrs. Baker).

**Clubiona pacifica** nov. sp.—Length 8 mm.; ceph. 3 mm. long; 2.1 mm. wide; patella plus tibia iv. 3 mm. Cephalothorax brownish yellow; darkest near eye-margin; mandibles reddish brown; sternum, legs and palpi yellowish; last joints of palpi and tips of tarsi blackish; abdomen gray or reddish, with a median basal brown stripe reaching almost to the middle of dorsum; the a. m. e. about their diameter apart, and about the same distance from the larger a. s. e.; p. m. e. two and one-half times their diameter apart, about twice their diameter from the smaller p. s. e.; the a. s. e. a little larger than p. m. e.; mandibles large and slightly porrect; sternum narrow, truncate at base; fourth pair of legs much the longest, all with scattered black spines, two or three beneath on tibia iii: there is a patch of blackish hairs on the underside of the tips of metatarsi iii and iv; the epigynum has a large middle lobe, concave behind, each side there is a round cavity separated by a clavate septum.

Several specimens, Olympia, Wash. (Trevor Kincaid).

**Phrurolithus affinis** nov. sp.—Length ♂ 2.2 mm. Cephalothorax yellow-brown, streaked with black; legs yellowish, blackish on bases of anterior femora; sternum pale, with blackish edges; abdomen black, with an indistinct pale curved spot each side before the middle, a still less distinct pair at base; structure very similar to *P. pugnatus*, but the eyes of posterior row are farther separated, the p. m. e. being about two-thirds their diameter apart (less than half in *P. pugnatus*); sternum very broad and triangular; the palpi are similar to *P. pugnatus*, but larger; the outer process of the tibia is slightly outcurved near its tip; the projection to the femur is near the base.

One male, Ft. Collins, Colorado (Mr. Baker). It can hardly be a western variety of *P. pugnatus*, as I have typical specimens of the latter from Washington.

**Apostenus cinctipes** nov. sp.—Length 4. mm. Cephalothorax yellowish, eyes surrounded by black; a reddish stripe each side, starting quite narrow, but becoming much broader near dorsal groove; a black marginal line; mandibles, legs and sternum pale yellowish; red bands at middle and tip of femur, on patella, and at bases and tips of tibia and metatarsus; abdomen pale, suffused with reddish above and some white spots, a distinct basal red spear-mark, faintly connected to some apical red chevrons; venter yellowish; cephalothorax somewhat similar to *Agræca*, head quite distinct. Abdomen oval, broadest a little behind the middle; sternum quite broad, pointed behind: lip much broader than long; fourth legs longest, then first: all with stout spines, those under tibiæ and metatarsi i and ii being very stout and long, and arising from slight projections; two rows of five each under tibia, two rows of three each under metatarsus: upper row of eyes slightly recurved, equally large, and very much larger than lower eyes: the p. m. e. closer to s. e. than each other; the a. m. e. smaller than a. s. e.; clypeus very low; the epigynum shows two anteriorly diverging reddish ridges, the narrow furrow between them has an opening behind, each side is a yellowish elliptical patch.

One specimen, Olympia, Wash. (Trevor Kincaid). This genus is related to *Phrurolithus*, but the eyes of the posterior row are much larger, and the row slightly recurved; the a. m. e. are smaller than the a. s. e.

**Corinna pacifica** nov. sp.—Length 6.8 mm.; ceph. 2.3 mm. long, 1.4 mm. wide; patella plus tibia iv, 2.2 mm. Form of *C. amœna*. Cephalothorax and mandibles reddish, eyes surrounded with black; sternum red-brown; femora reddish, rest of anterior legs yellowish, posterior legs suffused with brown; abdomen dark red-brown, rubbed, but showing some plumose white scales near the base; a. m. e. separated by about their diameter, about as large as p. s. e.; sternum a little longer than broad; a horny shield at base of the abdomen in the female, the male abdomen wholly covered above by a horny shield; the epigynum shows two oval openings, more than their diameter apart, about like *C. pinnata*. Length of male 5.6 mm.; the tibia of the palpus has two conical projections below, the basal one the larger; the tarsus is long, attenuated at tip; the pale organ much like *C. crocata*, but the tube very short.

Olympia, Wash. (Trevor Kincaid).

**Corinna media** nov. sp.—Length ♂ 5.4 mm., ceph. 2.2 mm. long, 1.2 mm. wide; patella plus tibia iv, 2.1 mm. Form of *C. bivittata*. Cephalothorax, mandibles and sternum reddish, anterior legs yellowish, brownish on femora, posterior femora pale at base and on underside, rest black, patellæ marked with black, tibiæ pale at base and tip, metatarsi wholly black, tarsi blackish. Abdomen dark brown, nearly black above, with a narrow basal band and two other broader bands before the middle, a narrow middle band, and a subapical circle white; a. m. e. separated by much more than their diameter, slightly smaller than p. s. e.; sternum a little longer than broad.

Olympia, Wash. (Trevor Kincaid). One ♂ not quite adult.

## THERIDIDÆ.

**Mysmena bulbifera** nov. sp.—Length ♂ 1.3 mm.: ♀ 1.5 mm. Cephalothorax reddish, eyes surrounded by black rings; mandibles and sternum reddish; legs yellow. Abdomen grayish, with two small silvery spots on each side, in the ♀ there is a black spot between them. Head raised, posterior row of eyes procurved, s. e. touching, p. m. e. largest, less than their diameter apart; a. m. e. their diameter apart; mandibles of the ♂ with a large tooth near tip over the base of the fang. Legs moderately long, first pair longest, hairy, a hump on posterior side of each patella; sternum broad, rounded behind; ♀ not quite adult, the abdomen globose, region of epigynum swollen and with a transverse fissure; ♂ palpal organ a nearly spherical bulb, the tarsus reduced to a slender projection from base, tube short, with a short projection each side.

Washington, D. C.; Jamesburg, N. J.; Shreveport, La.; Runnymede, Fla.

**Mysmena 4-maculata** nov. sp.—Length ♀ 1.5 mm. Cephalothorax, legs and sternum pale yellowish, the latter blackish on margins, eyes on black spots; abdomen gray, with a large black spot each side at base, and a smaller one on each posterior side some distance above the spinnerets, a dark median stripe on venter; eyes large, the m. e. but little larger than the s. e.; p. m. e. their diameter apart, closer to the p. s. e. Legs quite stout, shorter than in *M. bulbifera*, clothed with stiff bristles, no spines, metatarsi longer than tarsi, a hump on the posterior side of each patella; sternum as broad as long, broadest between coxæ i and ii, sides undulate, rounded between hind coxæ. Abdomen high, glo-

bose, but plainly longer than broad, with stiff bristles; the epigynum is a hemispherical area, in the middle of which are two red holes, about their diameter apart.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Ceratinopsis bicolor** nov. sp.—Length 1 mm. Cephalothorax wholly blackish above, p. m. e. and s. e. white; mandibles marked with black; maxillæ and lip blackish; sternum large, convex, with a few blackish patches. Legs and palpi pure white. Abdomen globose, white, yellowish around base and spinnerets, a black circle each side above the lung-plates.

Of this very distinct little species I have two females, neither quite adult; from a deep swamp near Ithaca, N. Y.

**Ceratinopsis similis** nov. sp.—Length ♀ 1.3 mm., ♂ 1.1 mm. Cephalothorax orange, each eye with a black ring; sternum red or yellow; femora orange, rest of legs gray. Abdomen of ♀ reddish above with a few lines near tip, venter whitish; ♂ abdomen gray, the spinnerets blackish. It is smaller and paler than *C. nigripalpis*, but quite similar in structure; the ♂ palpus has the projection of the tibia longer and larger than in that species; the middle space of the epigynum is narrow at base, and tapers more gradually than in *C. nigripalpis*.

One ♂, Shreveport, La.; one ♀, Runnymede, Fla.

In the genus *Ceratinopsis*, *C. interpres* is hardly congeneric with the other forms, and my *C. frontatus* is a *Maso;* the other species may be separated as follows:

1. Cephalothorax wholly black.....**bicolor.**
   Cephalothorax mostly reddish.....2.
2. Sternum with many roughened, irregular dark marks; black spot on pars cephalica not truncate behind.....**laticeps.**
   Sternum without any such markings.....3.
3. The black spot covering whole of head, truncate behind..... **nigriceps.**
   Black spot only around eyes.....4.
4. Each eye with a black ring.....**similis.**
   Black spot including all the eyes.....**nigripalpis.**

**Maso polita** nov. sp.—Length ♂ 1.5 mm.; ♀ 1.7 mm. Cephalothorax yellow-brown, blackish around eyes. Abdomen whitish or greenish; the sternum brown; legs pale. Head broad, very much so in the ♂; in ♀ the p. m. e. are less than their diameter apart, and a little farther from the p. s. e.; a. m. e. but little separated, and farther from the a. s. e.; in the ♂ the s. e. are very much more removed from the m. e. than in the ♀. Legs moderate, in the ♀ there are long spines under tibiæ i and ii, each tibia bears above one spine near base and one near tip, and one or two very long fine hairs; sternum short, sides rounded, obtusely pointed at tip, hind coxæ widely separated; the epigynum shows a transverse reddish area, in the middle a small cavity divided by a broad septum, sometimes the red each side appears as a round cavity; the tibia of the ♂ palpus has a stout projection on the outerside, and another above; the tube starts from the outerside, curves toward the tip and extends upward beyond the tarsus; there is a broad piece at base.

Several specimens, Washington, D. C.

The genus *Maso* is distinguished from *Ceratinopsis* by not having the sternum broadly truncate behind, in the spiny anterior tibiæ of ♀, and in the broad head of ♂.

**Grammonota maculata** nov. sp.—Length 2 mm. Cephalothorax and mandibles reddish yellow, eyes surrounded by black; legs and sternum pale; abdomen white, with a more or less connected median row of black spots above and a few on the sides and around the spinnerets. Legs moderately long, one spine above on each tibia. Head slightly elevated behind the eyes, more so in ♂ than ♀; sternum broad, triangular, produced between hind coxæ. Abdomen but little broader than cephalothorax, twice as long as wide; the epigynum shows each side a reddish elliptical area and between them a red area much broader than long and divided in the middle, behind it is a small semicircular lobe; the tibia of the ♂ palpus has a hook on the outerside much like *G. ornata*, but longer; the palpus much like *G. ornata;* there is a large plate on outerside with band across and a large hook at base, the outer end bent nearly at a right angle backward, the other end bent upward; on innerside a piece like that in *G. ornata;* the tube is a little longer and the tip less curved than in that species.

Runnymede, Fla.; Brazos County, Texas.

**Bathyphantes floridana** nov. sp.—Length 1.6 mm. Cephalothorax and legs dull yellow-brown; sternum black; abdomen black; everywhere clothed with long fine hair. Head somewhat elevated; eyes large, posterior row nearly straight; p. m. e. about their diameter apart, closer to the p. s. e.; mandibles quite large and stout. Legs moderately slender; sternum convex, about as broad as long, narrowed between the hind coxæ. Abdomen about twice as long as broad, subcylindrical; the epigynum consists of a hardened semicircular area, with a narrow finger across it; the male palpal organ is quite complicated; the tibia is short and broad, with two minute teeth on the tip above; the tarsus has two sharp-pointed teeth projecting backward from its basal end above, the upper tooth the larger; the hook is slender, divided into three parts, the inner larger part is broadly rounded, the two other parts across the base of the palpal organ are sharp-pointed and slightly bent; there is a slender upright piece slightly curved and on one edge with a fringe of hairs.

Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Bathyphantes parva** nov. sp.—Length ♀ 1.4 mm. Cephalothorax yellow-brown, blackish around eyes, legs yellowish, palpi brownish, sternum and venter brown. Abdomen dark gray, above with three cross-bands and a large apical spot white, on the sides the apical spot extends a short distance toward the base; cephalothorax broadest beyond middle, broadly truncate behind; abdomen broadest before middle, tapering behind; posterior row of eyes straight; p. m. e. less than their diameter apart, about as far from p. s. e.; a. m. e. small and close together; sternum about as broad as long, broadly rounded between the hind coxæ. Legs long and slender, two spines above on tibiæ; region of epigynum swollen, emarginate behind, a small central finger nearly across it, each side shows a curved tube.

Washington, D. C.; one specimen.

Easily separated from the other banded species of the genus by its small size and peculiar pattern of markings.

**Bolyphantes pacificus** nov. sp.—Length ♂ 2. mm. Cephalothorax, legs and palpi wholly reddish; abdomen black, with small pale spots, and a large transverse white one a little above the pale spinnerets. Head prominent with some scattered granules above; a large projection just behind the eyes, with several short hairs and a long, stiff, curved bristle at tip; posterior row of eyes barely recurved; p. m. e. fully their diameter apart, and about as far from the p. s. e.; in ♂ hardly their diameter apart, and closer to the p. s. e.; a. m. e. small and about their diameter apart; sternum very broad in front, blunt pointed behind. Legs long and slender; ♂ abdomen more than twice as long as broad: the ♀ lacks the granules on the head, and the large oval abdomen has no white spot; the epigynum shows a pair of rounded lobes behind, and in front and partially lying upon them is another pair closer together, each outerside of the latter pair there is a small black hole; the ♂ palpus is similar to *B. drassoides* Em.; the projection to the tibia is not so long and proportionally broader; the hook of the tarsus extends back to the base of the tibia, but is stouter than in *B. drassoides*, and there is no other tooth; the tube starts as in *B. drassoides* and extends upward along the lineated piece.

Olympia, Wash. (Trevor Kincaid).

## EPEIRIDÆ.

**Plectana venusta** nov. sp.—Length 7 mm., ceph. in front 1.8 mm. Cephalothorax pale yellowish, brown each side; abdomen yellowish, a brown spot near base, a broad whitish band and behind a triangular brown spot, sometimes a whitish stripe from basal spine and then a brown folium; venter brown, with two pale spots; sternum brown, with a pale central mark. Legs pale, banded with brown; cephalothorax nearly twice as long as broad; sternum once and a half longer than broad. Abdomen plainly longer than broad, with the same number of projections as in *P. stellata*, but four of them very much enlarged, viz., the median one at base, one at each anterior corner, bifid at tip, and the apical one over the spinnerets, on each side are three small humps; the epigynum has a finger similar to *P. stellata*.

One female and two young, Punta Gorda, Fla. (Mrs. A. T. Slosson). Related to *P. stellata*, but easily distinguished by its much narrower body and the enlarged spines on the abdomen above.

**Singa floridana** nov. sp.—Length 3.7 mm. Cephalothorax greenish yellow, pars cephalica reddish, darkest on sides; mandibles with red lines. Legs greenish yellow; patellæ, tibiæ and metatarsus of anterior pairs with elongate red spots, less distinct on the hind pairs; sternum and coxæ greenish yellow. Abdomen greenish yellow, with two prominent submedian red stripes reaching from base to tip, broadest at base and converging toward tip, where they surround the spinnerets; three white stripes, one between the red and one each side; cephalothorax a little shorter than femur i; a. m. e. a little closer to each other than to the slightly smaller a. s. e.; p. m. e. about once and a half their diameter apart, more than twice their diameter from the somewhat smaller p. s. e.; quad-

rangle of m. e. slightly narrower behind than in front. Legs moderately slender, clothed with bristles and scattered spines, mostly above and on the sides of joints, a distinct hump on posterior sides of all patellæ; sternum barely longer than broad, sides undulate, pointed behind. Abdomen once and a fourth longer than broad, broadest in middle, not tapering behind; the epigynum has a short pale finger with recurved tip, each side a brown, nearly circular cavity.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Siuga modesta** nov. sp.—Length 3.5 mm. Cephalothorax pale yellow-brown, a large white spot, anteriorly pointed, on posterior part of the pars cephalica. Legs pale yellowish, more brown on the middle of the joints; mandibles pale, with a brown spot; sternum yellow-brown, blackish on the sides. Abdomen black, a narrow white stripe on each side, meeting behind above the spinnerets, above with many irregular white spots and two pairs of impressed dots: venter with a narrow white stripe each side, sometimes broken up into spots; cephalothorax three-fourths as broad as long, longer than femur i, about as long as patella plus tibia i; a. m. e. a little closer to each other than to the slightly smaller a. s. e.; p. m. e. larger than other eyes and about once and a half their diameter apart, about twice their diameter from p. s. e.; legs moderately short, with many bristles, probably a few spines, but all rubbed off, a little hump on posterior sides of all patellæ; sternum triangular, about as broad as long, sides undulate, blunt pointed behind; abdomen elliptical, once and a half longer than broad; epigynum consists of a quadrate area, in which is the outline of a triangular body with the apex forward, this is traversed by a narrow septum.

Two specimens, Punta Gorda and Lake Worth, Fla. (Mrs. A. T. Slosson).

## THOMISIDÆ.

**Xysticus floridanus** nov. sp.—Length 3.2 mm. Cephalothorax yellow-brown, marginal seam dark, two elongate converging whitish spots on the posterior part of the pars cephalica, a white band through the eye-region; femora i and ii pale yellow-brown, darkest toward tips, the tibiæ clear red-brown, the metatarsi paler and the tarsi yellowish, posterior legs wholly pale; sternum pale. Abdomen whitish above, with four large irregular brown spots, their outer margins connected, the posterior pair transversely united, the sides light brown; venter pale brownish with white dots; cephalothorax moderately low, as broad as long, hardly shorter than femur i; eyes of posterior row about equal; a. m. e. equal to p. m. e., but closer together; a. s. e. very much larger than other eyes Legs moderately short and stout, three spines in front and one above on femur i; tibiæ i and ii with four pairs below, three pairs under metatarsi i and ii; sternum plainly longer than broad, sides rounded. Abdomen truncate at base, slightly narrower and barely longer than the cephalothorax; the male palpus has an elevated ridge on the base of tibia, which is prolonged on the inner side; a pointed projection at tip of tibia; tarsus broad, distinctly pointed at tip; palpal organ broad, simple, from the lower inner end a tube arises and runs upward and around the bulb, near the lower middle is a short curved black hook, and on inner side a dark stripe runs upward and around the end.

One male, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Coriarachne floridana** nov. sp.—Length 4. mm. Cephalothorax uniform brown; legs a paler brown, except the tarsi, which are whitish; above with some scattered silvery dots, below none; a short white band in eye-region; sternum light brown. Abdomen brown, with silvery dots on sides and larger transverse spots above; venter gray-brown; very similar in structure to *C. versicolor*, but the palpal organ is broader, the bulb nearly circular in outline, more distinctly divided into two portions, the tube similar, but hardly as long, the projections on the tibia are the same; four pairs of spines under tibiæ and metatarsi i and ii; an immature female resembles the male, but is of a paler brown color.

Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Misumena viridans** nov. sp.—Length ♀ 4 mm., ♂ 3 mm. Cephalothorax and legs green, tarsi more yellow, both with long, prominent, black bristles; sternum paler. Abdomen whitish, more gray above, with some silvery spots and red dots at the bases of some of the black bristles; cephalothorax broad, considerably narrowed in front; the a. m. e. hardly nearer to a. s. e. than to each other; m. e. equal, forming a square; four pairs of spines under tibiæ i and ii; three pairs under those metatarsi; femur i longer than the cephalothorax; sternum but little longer than broad, sides rounded. Abdomen broad, pointed behind, convex above; on each side of the epigynum are two curved dark spots; there is a broad septum to the cavity as in the other species; the ♂ is similar to the ♀, but with longer legs, and on them red bands as follows: at tip of patellæ, at base and tip of tibiæ, and apical half of metatarsi and tarsi; posterior legs with red spots at tips of patellæ and tibiæ; abdomen with four red spots above on basal half and four red bands on apical half, a red ring around base of spinnerets; there is a short blunt projection on the outer tip of the tibia of the ♂ palpus; the palpal organ nearly circular in outline, the tube arising near the outer tip and extending around on inner side to near base.

Three specimens, Punta Gorda, Fla. (A. T. Slosson).

**Misumena bellula** nov. sp.—Length ♀ 4 mm. Cephalothorax pale yellowish, with a broad irregular red-brown band each side, and sometimes a brown line on extreme margin, eye-region and clypeus reddish, a median line from between p. m. e. extending back to near dorsal groove; a silvery white spot each side of its tip: mandibles with a spot at base, and a transverse line reddish; anterior legs sometimes almost wholly red-brown, with pale at bases of femora, but more often pale in the middle of the joints, with spots at the bases of the bristles; sternum and posterior legs whitish. Abdomen with a broad fuscous stripe each side from base to spinnerets, above mottled white and gray, with a basal spear-mark and behind four converging pairs of fuscous spots, bases of the bristles reddish; venter pale, with a broad median dark area; cephalothorax about as broad as long; eyes of anterior row about equal distances apart; m. e. equal, forming a square; femur i much longer than cephalothorax, four pairs of spines under tibiæ i and ii, five pairs on those metatarsi; sternum plainly longer than broad, sides rounded; abdomen broadest behind the middle, pointed behind, convex above; the epigynum consists of a broad septum passing under an anterior ridge, which is convex behind, side is an oblong cavity, and behind are two small holes.

Four specimens, Punta Gorda, Fla. (Mrs. A. T. Slosson).

## LYCOSIDÆ.

**Lycosa floridana** nov. sp.—Length 14 mm. long, 4 mm. broad; tibia, plus patella i, 6 mm.; tibia plus patella iv, 7 mm. Cephalothorax dark brown, two pale lines on pars cephalica and a white interrupted line on each side above the margin; mandibles black; sternum pale yellowish, with a median black stripe; femora yellowish brown, rest of legs darker, sometimes indistinctly banded on posterior tibiæ. Abdomen black above, with small, scattered white dots; venter pale, with a darker central stripe; first row of eyes procurved, eyes of second row hardly their diameter apart, and about the same distance from the slightly smaller eyes of the third row; three pairs of spines under tibia i, two pairs under metatarsus i: sternum oval; abdomen quite slender, cylindrical; the epigynum consists of a rounded cavity, a little longer than broad, in which there is an inverted T-shaped septum, much the broadest in front, somewhat like *L. pratensis*.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Trochosa floridana** nov. sp.—Length 6.5 mm., ceph. 3 mm. long, 2.1 mm. broad; tibia plus patella i, 2.4 mm.; tibia, plus patella iv, 3 mm.; the cephalothorax is pale yellowish, with black spots around the eyes, a brown irregular stripe each side, leaving the pale central area about as broad behind as in front; mandibles red-brown; sternum and legs pale yellowish, indistinct darker bands on patellæ, bases and tips of tibiæ, metatarsi and tarsi yellowish brown. Abdomen whitish, with an indistinct yellowish basal spear-mark and a broad irregular black stripe on each upper side, behind the basal third this is broken up into spots; region of epigynum pale red-brown; cephalothorax and head low, sides convexly sloping; first row of eyes as long as the second, straight, all close together; eyes of second row much less than their diameter apart; dorsal eyes much closer together than usual, not farther from each other than from the slightly larger second eyes; mandibles long and stout; sternum but little longer than broad, rounded. Legs short, three pairs of spines under tibiæ and metatarsi; abdomen once and two-thirds as long as broad; the epigynum shows only as a concave transverse ridge.

Two specimens, Punta Gorda, Fla. (Mrs. A. T. Slosson).

## OXYOPIDÆ.

**Oxyopes compacta** nov. sp.—Length 6 mm., ceph. 2.7 mm. long, 2 mm. broad. The cephalothorax is dark brown, a vertical white spot on the center of clypeus; mandibles dark brown, with a pale line; sternum dark brown, pale in center; coxæ pale. Legs pale, the femora, except base, infuscated; patellæ brown, brown bands on base, middle and tip of tibiæ and metatarsi. Abdomen dark brown, paler on lower sides; a broad dark brown stripe on venter; everywhere clothed with white scales, those on posterior middle of abdomen somewhat rufous and on each side of abdomen above above they form two or three oblique white lines, and on cephalothorax an indistinct central stripe; cephalothorax highest in eye-region, slightly concave behind; p. m. e. about two and a half times their diameter apart; legs moderately long, with long spines; sternum somewhat oval; abdomen one and a half times longer than broad, broadest near base, tapering and blunt pointed behind; the epigynum consists of a cavity twice as wide as

long, partially covered by a lobe one and one-fourth times as wide as long; somewhat like *O. scalaris*, but the lobe not as broad and showing more of the cavity each side.

Ft. Collins, Colo. (Mrs. Baker).

## ATTIDÆ.

**Philæus monticola** nov. sp.—Length 6.5 mm., ceph. 3 mm. long, 2.2 mm. broad. Cephalothorax black, a broad white stripe each side, but not reaching the hind margin, white on clypeus. a tuft of stiff black hairs just behind eyes of second row, a smaller tuft behind lateral eyes of first row; mandibles slightly iridescent greenish. Legs red-brown, tarsi paler, clothed with white hair, very long under femur and tibia i: sternum dark red-brown. Abdomen black, a narrow white band around base, a broad tawny stripe on each upper side; venter with a white stripe each side; a white stripe on inner side of patella and tibia i, a yellowish stripe above on tibia i: of the usual structure of the genus; there is a short truncate projection at outer tip of tibia; palpal organ divided into two parts, the lower and larger has a convex projection on the inner side; on the outer side there is near the tip a mark like that of *P. militaris;* the upper part is broader than long, irregularly striate, with a black tube at tip, which is sinuate, and has a simple tip.

One male, Ft. Collins, Colo., sweeping, May (Baker).

**Icius pleuralis** nov. sp.—Length 4 mm.; ceph. 1.6 mm. long, 1.25 mm. broad. Cephalothorax red-brown, clothed with golden scales; legs red-brown, except the pale tarsi; tarsi, patellæ and tibiæ ii. iii and iv, lined with pale yellowish; sternum and mouth-parts red-brown; anterior coxæ reddish, others pale. Abdomen whitish, a broad red-brown stripe on each side, dorsum with scattered golden scales and short black hairs; the cephalothorax is low and flat, eye-region one-third broader than long, slightly broader behind than in front, eyes of second row nearer to lateral than dorsal eyes; first row straight, all nearly touching, the diameter of lateral eyes is scarcely as great as radius of middle eyes; mandibles short and stout; anterior coxæ separated by nearly width of lip; sternum broadest in middle, one-third longer than broad, blunt pointed. Legs quite short and stout, first pair stoutest, but little longer than fourth pair, three pairs of spines under tibia i, two pairs under metatarsus i; metatarsus iv spined only at tip. Abdomen nearly once and two-thirds as long as broad, broadest a little before the middle, moderately depressed; the epigynum has a central piece nearly twice as long as broad, outlined in front by a narrow oblique cavity each side, and behind deeply excised in the middle.

One female, Punta Gorda, Fla. (Mrs. A. T. Slosson).

## ACARINA.

**Trombidium marinus** nov. sp.—Length 2 mm. Bright red: body pyriform, but not so large in front as in some species, a few depressions above; eye-stalks short; mandibles slender. Legs short, anterior pair shorter than body, posterior pair not reaching to tip of abdomen; last joint of leg i slightly enlarged, barely longer than the preceding joint. Body with short feathered hairs, not so short, however, as in *T. sericeum;* second joint of palpus quite long; third short, barely longer than broad; claw quite long; thumb longer than claw, clavate, and with many fine hairs, longer than in *T. sericeum.*

Under stones among salt-grass, between tide-marks at Sea Cliff, N. Y. It is easily separated from *T. sericeum* by the shorter third joint of palpus, and from *T. pacificum* by the less pyriform body and the finer hairs. It feeds on the maritime coccid *Ripersia.*

**Ottonia granulosa** nov. sp.—Length 2 mm., leg iv 1.8 mm. Red, pale beneath between coxæ, a pale spot each side above coxa of third leg, venter pale in middle. Legs and palpi pale, legs i and iv reddish in middle: stout, convex, broadest at shoulders, considerably narrowing to the eyes; cephalothorax short and sloping into the dorsum of abdomen without any definite break; dorsal groove short, enlarged at end; eyes sessile, but projecting; above thickly clothed with two sizes of rounded granules, the smaller the most numerous, a few on venter. Legs and palpi clothed with short clavate scales; last joint of leg i a trifle longer than the preceding joint, that of leg iv about as long as penultimate; ventral openings clothed with short fine hair; palpi short, stout, third joint about as long as broad, two claws at tip of fourth joint, the inner one the smaller; there are three equal spines along the outer side, the thumb is longer than claws, cylindrical and blunt-tipped, clothed with fine hair.

Four specimens, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Ottonia trombidiodes** nov. sp.—Length 2 mm., leg iv 1.6 mm. Red above, pale beneath, the pale extending up on sides near the middle, legs and palpi pale; stout, the sides nearly parallel or slightly tapering, more slender than *O. granulosa;* cephalothorax small, separated from dorsum of abdomen by a distinct break: a transverse impression near the middle of body and several smaller ones in front; at the tip above is an impressed triangular plate, similar to *O. locustarum.* Legs short, but not very stout, last joint of leg i plainly longer than penultimate, last joint of iv as long as penultimate. Body clothed with appressed narrow scales, finer on venter; legs and palpi with still narrower scales, almost hairs: palpi stout, third joint as broad as long; two claws at the tip of fourth joint, the inner the smaller, on outer edge three stout, equal spines; thumb cylindrical, blunt-tipped, with fine hairs.

Two specimens, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Rhyncolophus floridanus** nov. sp.—Length 2 mm., leg iv 2 mm. Above black, with a pale (red in life) median spot in front; a large oblique spot each side, uniting just behind the dorsal groove, then continuing as a median stripe toward the apex, which it does not reach; a larger median spot at apex; leg i blackish, except apical joints; legs ii and iii pale, indistinctly ringed with black at the tips of the joints; leg iv blackish in middle; venter pale. Body slender, three times as long as broad, slightly constricted at third legs; dorsal groove reaching to near middle, enlarged at each end; last joint of leg i a little shorter than the preceding joint, last joint of leg iv about two-thirds as long as the preceding joint.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Smaris australis** nov. sp.—Length 1.1 mm. Pale yellowish; body oblong, with a rounded snout in front, which bears above six eyes in the usual arrangement. Body covered with a network of fine hairs, at the intersections arise very short curved stiff bristles; above two rows of five small depressions. Legs

very short, not as long as the breadth of body, clothed with fine short bristles; last joints of legs i and iv about as long as the penultimate and slightly enlarged at tips; mouth-parts retracted; genital opening once its length in front of the smaller anal opening.

One specimen, Punta Gorda, Fla. (Mrs. A. T. Slosson).

**Bdella tenella** nov. sp.—Length .6 mm. Pale reddish, irregularly mottled with blackish; four or five elongate pale stripes on the cephalothorax; abdomen marked with blackish, darkest on the sides, paler below; legs whitish hyaline; mandibles and palpi reddish. Mandibles very long and slender over once and one-half as long as the cephalothorax, with two bristles above on each side; second joint of palpus about three-fourths as long as the mandibles; third and fourth very short; fifth about twice as long as broad, not one-third as long as the second joint, three bristles near the truncate tip, one very short, an outer one as long as the mandibles, and an inner one-half as long; the cephalothorax is broader than long, truncate in front, rounded behind, narrower than the abdomen, a short bristle at each corner. Abdomen about twice as long as broad, concave at base, the shoulders projecting, contracted in the middle and broadly rounded at tip, a short stiff bristle on each shoulder, and about six similar ones around the apex. Legs short and very stout, with some stiff bristles.

Under bark of oak trees, Sea Cliff, N. Y., May. Readily separated from *B. cardinalis* by its mottled appearance and slender form.

**Eupodes marinus** nov. sp.—Length .35 mm. When alive, bright red in color, in acohol it becomes greenish, with a pale median stripe on the abdomen, legs hyaline; the cephalothorax is narrower than the abdomen, somewhat triangular, truncate in front, no distinct eyes; mandibles quite prominent, half as long as the cephalothorax; palpi thick and stout, penultimate joint not twice as long as broad, last joint not half as long as the penultimate, pointed, and with several short stiff spines at tip. Abdomen somewhat swollen at shoulders, about once and one-half as long as broad, tapering behind and broadly rounded at tip, above with a few scattered blunt hairs, a longer one on each shoulder and about a dozen at tip. Legs short, with fine hairs; leg i the longest, but plainly shorter than the body, femur i not quite as long as the cephalothorax, is broadest at base about equal to the femur plus patella ii; femur iv thickened as usual in the genus.

Running over rocks between tide-marks at Sea Cliff, N. Y. It has shorter legs and stouter palpi than *E. variabilis*. I have seen a few specimens which are a little larger, and are covered with small black spots, but I am not sure that they form a different species.

**Oribatella perfecta** nov. sp.—Length .45 mm. Reddish brown, a pale spot at base of abdomen above, legs yellowish; tectal plate short, broadly cleft in front, tip of each projection slightly truncate and giving rise to a long stiff bristle, superior bristles long, sub-erect; each side under the tectal plate there is a short elevation bearing a stout curved bristle in front; setæ very short, thick and clavate, not half the length of the superior bristles. Abdomen depressed, convex, finely granulate, with about twenty-five bristles above, all shorter than the bristles of the cephalothorax; no small spots visible. Wings long, triangular, rounded below, venter with a few scattered short hairs; genital opening once

and a half its length in front of the larger anal opening: coxal plate with three short lines each side. Legs moderate, hairy, a curved plate behind the first femora.

Many specimens swept from low herbage in May at Pine Island near Bayville, N. Y. Also one from Norfolk, Va., collected by Capt. Thos. L. Casey. Related to *O. bidentata* and *O. obesa*, but separated by the thick setæ, shape of wings, and unspotted abdomen.

**Oribatella minuta** nov. sp.—Length .3 mm. Pale reddish brown, legs paler, a pale spot at base of abdomen; setæ, bristles and hairs white. Body quite high, globose; tectal plate short and broad, divided into four spine-like processes in front, the median pair quite close together and smaller (but not shorter) than the outer ones; between the inner and outer spine on each side arises a very stout anterior bristle, about as thick as the median processes of the tectal plate and plainly longer; superior bristles as large as anterior pair, projecting forward; on each side of the tip of cephalothorax is a stout curved bristle, which, on its outer side, bears a row short hairs; setæ not very short, clavate. Abdomen finely punctulate. Wings large, deep, somewhat pointed and incurved at tip; above on the abdomen there are about twenty fine curved hairs, about as long as the setæ; venter granulate, genital opening more than its length in front of the slightly larger anal opening; coxal plate transversely divided. Legs short, finely haired, those on outside of the patellæ and tibiæ are much thicker than the others.

One specimen, under hemlock bark, Sea Cliff, N. Y., March.

**Belba floridana** nov. sp.—Length .6 mm. Yellowish brown, a median dark mark on the base of the abdomen; cephalothorax triangular; two pairs of anterior bristles; superior bristles erect, fully twice as long as the short clavate setæ. Abdomen elliptical, convex, smooth, with about eighteen bristles above; venter smooth, genital opening about once and one-half its length in front of the larger anal opening; coxæ as in *B. minuta*.

Punta Gorda, Fla. (Mrs. A. T. Slosson). Closely related to *B. minuta*, but larger, and the short setæ not half so long as the bristles of abdomen.

**Eremæus marginalis** nov. sp.—Length .4 mm. Dark brown; cephalothorax triangular, rounded in front, with two short curved hairs at tip, with numerous ridges above and the outline of a trapezium in the center, a plate-like projection behind coxæ i, a spine-like projection behind coxæ ii; setæ very short, strongly capitate. Abdomen depressed, about once and a half as long as broad, elliptical, with a broad membranous margin, which is strongly striated; above with many irregular intersecting ridges; below granulate, the genital opening about two-thirds its length in front of the larger anal opening; coxal plate transversely divided. Legs very short, femora thickened, with only a few short hairs; on the penultimate joint of the anterior pair there is a projection bearing a longer hair at tip; from the side a few very short stiff hairs can be seen on the dorsum.

Numerous specimens found clustered under lichens on the bark of apple trees in March, at Sea Cliff, N. Y. Some young specimens are pale, with a transversely striated abdomen, and a row of several spatulate hairs at the tip.

**Carabodes brevis** nov. sp.—Length .4 mm. Dark red-brown, legs yellowish; the cephalothorax has an elevated plate-like ridge each side, and in the middle a long triangular elevated region, the sides of which are concave; four short, stiff, curved bristles in front, and two much longer ones near the base, each strongly curved toward the middle line; setæ short, capitate. Abdomen a little longer than broad, truncate at base and broadly rounded at tip; strongly pitted, or rather with a fine network of ridges, bearing about twenty-two stiff curved bristles about as long as the setæ, two submedian rows of four each, a lateral row of three, four on each posterior side, those near the base almost clavate, but those on sides simple; venter pitted like the dorsum; the genital opening fully its length in front of the larger anal opening; some short curved hairs on venter; outlines of the coxæ distinct and not forming a plate, roughened. Legs short, joints slightly fusiform, with simple hairs, some near the tips quite long.

Four specimens shaken from a dead fungus (*Polyporus*) in May, at Sea Cliff, N. Y. Related to *C. granulatus*, but differs in having simple hairs on the sides of the abdomen.

**Carabodes dorsalis** nov. sp.—Length .45 mm.—Pale brownish yellow; cephalothorax triangular, convex, with the outlines of a broad T-mark; two short anterior bristles, a pair of longer, appressed, superior bristles; setæ erect, moderate, clavate. Abdomen once and one-half longer than broad, sides nearly parallel, broadly rounded behind, not high, coarsely but evenly granulate above and below; on dorsum each side a lateral and a submedian row of four large stiff, curved, appressed, simple bristles, longer than the setæ; genital opening nearly once its length in front of the larger anal opening; coxæ separate. Legs short and very stout, some joints as broad as long, with very short spine-like bristles.

Three specimens taken from the surface of a large boulder, in the woods, near Sea Cliff, N. Y. General appearance of *C. apicalis*, but differs in more slender form, stouter legs, etc.

**Nothrus (?) marinus** nov. sp.—Length .9 mm. Black, sides of abdomen and tips of legs yellowish; cephalothorax triangular, the tip striated, a narrow oblong bridge appears to connect the base to the abdomen, its anterior tip is terminated by a ridge, each side of this on the cephalothorax there extends obliquely backward a curved ridge; apparently no setæ. Abdomen elliptical, high, smooth, but not shining, with some scattered, very short, sometimes almost clavate hairs; venter smooth, the genital opening distinctly separated from the larger anal opening; coxæ marked by incomplete lines. Legs much shorter than the body, with stiff, pointed bristles, a few finer ones near tips of tarsi, three claws, the middle one distinctly the largest, none of the joints of the legs swollen, except femora i, which are somewhat stouter than the others.

Not uncommon on rocks between tide-marks, Sea Cliff, N. Y. This is not a *Nothrus*, but nearer to it than to any other genus known to me. It will not agree with *Damæus*. Most of the specimens are young and have the abdomen transversely striate.

**Crabro minimus** Pack.

The ♂ of this species has the fore femora and mesosternum clothed with long, white hair, thus differing from the other species of the group, with the exception of *pictipes*, which is larger, has the clypeus and scape entirely yellow and the base of the middle segment excavated. In ♂ *minimus* the base of the middle segment is as described by Packard, having a row of minute fossæ.

An examination of types shows the pronotum to be angular at the sides, notwithstanding Packard's statement to the contrary.

**Crabro unicus** Patton.

This species forms a group differing from group *insolens* by the middle segment having a distinct enclosure above; by the epimerum mesothoracis being strongly ridged, an unusual character for species of this section of *Crabro*, and by abdomen, which is said to be clavate. The abdomen is missing from the unique type kindly loaned by Mr. Patton. The hind legs robust, their tibiæ strongly clavate and strongly serrated externally. Recurrent vein received by the marginal cell in the middle. Pronotum sharply ridged, with a small tooth laterally.

This may be the ♀ of group *planipes*, of which the males only are known.

In my paper the following errors, typographical and otherwise, occur which should be corrected:

Page 129, line 5, for includes *read* include; line 10, for peninsular *read* peninsula.
" 153, line 35, for 1 *read* 7.
" 159, line 19, for longitudial *read* longitudinal.
" 163, line 9, for *monticola* read *monticolus*.
" 167, line 14 (from bottom), for form *read* fore.
" 178, line 16 (from bottom), for is *read* are.
" 180, line 21, for and *read* or.
" 181, line 12 (from bottom), for anterio *read* antero.
" 196, line 25, for *nigror* read *nigrior*.
" 196, line 14 (from bottom), for *nigror* read *nigrior*.
" 212, line 9 (from bottom), for *stirpicola* read *stirpicolus*.
" 218, line 20 (from bottom), for *nigror* read *nigrior*.
" 220, line 20, for *denticulatus* read *pauper*.
" 221, line 21, for *stirpicola* read *stirpicolus*.
" 222, lines 5 and 12 (from bottom), for tibiæ *read* tarsi.
" 225, lines 28 and 29, for metathorax *read* middle segment.

Throughout my paper the termination of the Latin adjective after such nouns as epimerum and episternum should be *e* instead of *is*.

# THE DIPTEROUS GENERA TACHYTRECHUS AND MACELLOCERUS.

BY J. M. ALDRICH.

This group of the Dolichopodidæ contained, at the time of Loew's monograph, one genus and three species. Since then Loew published another species in his seventh Century, and Osten Sacken one in "Western Diptera." Mik has established a new genus for a part of the old one, and three new species are described in the present paper.

These two genera form a well-defined group, with the following characters: First antennal joint hairy above, arista dorsal, face long, narrow, wider below and rounded at the tip, reaching as low as the inferior border of the eye; wings narrow, in the male especially; hypopygium of the male entirely disengaged, directed forward under the venter, reaching nearly to the coxæ; hind metatarsi without bristles above.

The genera are separated by the following characters:

Male antennæ normal, like those of the female; fourth longitudinal vein ending just before the extreme apex, at a considerable distance from the tip of the third.....**Tachytrechus.**

Male antennæ with the second joint rudimentary and the arista elongated and ending in a lamella; fourth vein ending considerably before the apex, very close to the tip of the third.....**Macellocerus.**

## **Tachytrechus** Loew.

**Stannius isis** 1831, p. 261, Loew, Neue Beitraege, v, 1857; Mon. Dolichopodidæ, p. 109.

*MALES.*

1. Wing of male with a spot at the tip.....2.
   Wing of male without spot.....**angustipennis** Loew.
2. The spot wholly black.....**floridensis** n. sp.
   The spot black in front, snow-white behind.....**vorax** Loew.

*FEMALES.*

Posterior femora yellow at the extreme tip only.....**vorax.**
Posterior femora about a third of the length yellow.....**floridensis.**

(The female of *angustipennis* is not known.)

**Tachytrechus floridensis** n. sp.

*Male.*—Front green, heavily coated with whitish dust, face wholly pure white, about twice as wide on the lower division as immediately below the antennæ, palpi inconspicuous, proboscis black, inferior and lateral orbital cilia white; antennæ wholly black, the first two joints a little elongate, slender, the third rounded, the arista a trifle longer than the three joints. Thorax green, heavily coated with whitish dust, which leaves the ground-color more distinctly visible in some directions than in others; pleuræ with a more pure white dust, the green showing through; tegulæ and halteres yellow, the former with small black cilia; coxæ and basal two-thirds of femora green, overlaid with white dust, the tips of all the femora for a third their length (in the middle ones more) yellow, tibiæ yellow with black tips, tarsi black, the front ones four-fifths the length of the tibiæ; fore tibiæ with only two series of bristles, three or four in each, the one behind and a little towards the outside, the other opposite in front; hind femora with a row of three bristles before the preapical one. Abdomen of the same color as the thorax, more shining on the posterior part of each segment across the middle, with a rather strong row of hairs before each incisure—these and all the small hairs black; hypopygium black, the first joint, or pedicel, small; the second large, massive, sub-globular, with whitish dust and fine black hairs; lamellæ blackish, small, somewhat triangular, with a narrow base, the outer edge of each bearing a number of long black bristles extending laterally. Wings slightly grayish, narrow, pointed, with a large black dot in the apex, nearly the whole of which is behind the fourth vein; third vein almost straight in its whole course, with only a slight and nearly uniform curvature; large cross-vein quite oblique, straight, less than its length from the tip of the fifth vein; last segment of fourth vein straight, only a very little convergent towards the third, ending conspicuously before the apex of the wing.

*Female.*—Wings scarcely so narrow, without dot, antennæ a little shorter, face a trifle wider. On the outer side of the fore tibiæ there are one or two small bristles in a third series. Length 5 mm.; of wing 4 mm.

Two males, two females, Florida. Collected by Chancellor F. H. Snow. I obtained the specimens from the University of Kansas, and there are several more in their collection.

**Tachytrechus vorax** Loew, Neue Beitraege, viii, 41; Mon. Dolichopodidæ, 112. District of Columbia.

I have specimens from Brookings, S. D.; Hot Springs, S. D. (in the Black Hills); Jackson, Miss. (C. W. Johnson); and Franconia, N. H. (Mrs. Slosson).

**Tachytrechus angustipennis** Loew, Centuries, ii, 64; Monograph Dolichopodidæ, 113. District of Columbia; Osten Sacken, Western Diptera, 315, California.

I have not seen this species.

## **Macellocerus** Mik.

Mik, Dipterologische Untersuchungen, p. 3, 1878.

*MALES.*

1. Antennal arista with a lamella in the middle as well as at the tip. **binodatus** Loew.
   Antennal arista with an apical lamella only.....2.
2. Anterior femora thickened, black below on the basal half...**olympiæ** n. sp.
   Anterior femora not thickened, yellow.....3.
3. Outer side of fore femora with long, curly hair.....**auratus** n. sp.
   Outer side of fore femora with plain hair.....4.
4. Anterior tibiæ with a row of erect, flattened bristles on the outside below. **sanus** O. S.
   Anterior tibiæ with only a few common bristles on this part..**mœchus** Loew.

*FEMALES.*

1. Hind femora yellow, two preapical bristles.....**auratus.**
   Hind femora largely black, one preapical bristle.....2.
2. Front tibiæ wholly yellow.....**mœchus.**
   Front tibiæ largely black.....3.
3. Four anterior femora green-black, the apical third yellow, distinctly limited. **sanus.**
   Four anterior femora largely yellow, the brown at base not distinctly limited. **olympiæ.**

(The female of *binodatus* is unknown)

**Macellocerus olympiæ** n. sp.

*Male.*—Face long, bright yellow, slender in the middle; antennæ yellow, the third joint blackened except at base, second joint rudimentary; arista one and a third times as long as the vertical diameter of the head, white except the incrassated base and the obovate black lamella, which is a little smaller than the third joint; lateral and inferior orbital cilia light yellow. Thorax and abdomen bronze-green; tegulæ yellow, with black cilia; fore coxæ yellow, bare except the tip. Fore femora incrassated at the base, with a peculiar circular black spot seemingly stamped upon the outer side, reaching beyond the middle; the inner side is yellow, with a delicate pruinosity; fore tibiæ yellow, with numerous and rather long bristles; fore tarsi a little compressed, short, black; posterior femora and tibiæ yellow, tips of the latter narrowly blackened, tarsi black; bristles of the tibiæ rather long. Hypopygium large, basal part shining black, central segment bronze-green behind, lamellæ whitish, covered with black hairs, those of the margin hardly coarser. Wings exceedingly slender, grayish, lighter at the root.

*Female.*—All the body color darker, face wider and greenish yellow, third joint of the antennæ black, all the coxæ black, femora more or less dark on the basal part, the hind ones wholly black-green except the apical third; tibiæ black on the apical third or fourth. Wings longer and much wider than in the male. Length 6 mm.; of wing 4.2 mm.

Two males, two females, Olympia, Wash. (Trevor Kincaid), June 3 and July 1.

**Macellocerus auratus** n. sp.

*Male.*—Face long, golden-yellow, very narrow in the middle, antennæ bright yellow, small, the second and third joints both very minute and rudimentary, arista black, one and a half times the length of vertical diameter of the eye, the

obovate lamellæ black, as large as the three antennal joints together, with a very small white portion at the base: cilia of the lateral and inferior orbit white. Thorax and abdomen bronze-green, somewhat obscured in parts by greenish white pollen; the groove above the root of the wing velvet-black; second and third segments of the abdomen, with the central part of the hypopygium, having a coppery luster; tegular cilia black; lower part of the pleuræ with thin golden pollen, which becomes thicker near the coxæ and extends down the outside of the middle ones; fore coxæ and legs yellow, the former with a golden luster; the fore feet compressed, a little infuscated, with a satiny white reflection; on the outer side of the femora the hairs are fine and long and curly; the fore tibiæ are a little enlarged beyond their base and have two rows of slender bristles, those in the postero-lateral row are slightly flattened; posterior femora and tibiæ yellow, the latter tipped with black; middle tarsi a little pale at base, the rest black, hind ones black; middle femora with conspicuous long hairs before along the lower part; the same but in a less degree on the hind femora; lamellæ of the hypopygium whitish, small, with only small hairs. Wings short, moderately narrow, gray, yellowish at base.

*Female.*—Face whitish, wider, antennæ very short, third joint but slightly infuscated; fore tibiæ infuscated towards the tip. Legs with ordinary, but rather long bristles, two preapical bristles on hind femora (as in the male also), body color a little darker than in the male. Length 4.7 mm.; of wing 3.2 mm.

One male, two females, Moscow, Idaho, June 18. On moist sand at edge of mountain brook.

**Macellocerus mœchus** Loew, Neue Beitraege, viii, 40; Mon. Dolichopodidæ, 110 (*Tachytrechus*). Trenton Falls, N. Y

I have one male, Algonquin, Ill. (Dr. Nason , and one female, Franconia, N. H. (Mrs. Slosson).

**Macellocerus saunus** Osten Sacken, "Western Diptera," 316 (*Tachytrechus*). California.

I have numerous specimens, Craig's Mountain, Nez Perces County, Idaho, June 22 and 26, and Moscow, Idaho, June 18 and 25. Most of these were collected on fallen logs about the edges of a little damp meadow; others were taken at the edge of mountain streams on moist sand.

## A MONOGRAPH OF THE GENUS SYNERGUS Hartig.

BY C. P. GILLETTE.

I find in the college collection, as a result of our rearings for the past three years, a considerable number of *Synergus* species, some of which are new to science. As I have the original descriptions and also representatives of all the North American species, and as many of the descriptions are inaccessible to students of Entomology, I have concluded to bring together, in one paper, descriptions of all the species, with an epitome of our present knowledge in regard to their habits.

In this connection I wish to thank Mr. W. H. Ashmead who has, in past years, determined several species of *Synergus* for me, and who has sent me types of those species described by himself.

The members of this genus are all Inquilines, or guest-flies, inhabiting the galls of the oak-infesting Cynipidæ. Although true parasites, so far as the gall within which they develop is concerned, they are not parasites in the ordinary acceptation of that term as applied to insects, as they do not attack the true gall producer. They are vegetable feeders and not flesh consumers.

This genus is not a large one as at present known in this country. In Europe there are 31 described species of *Synergus*, while, including the eight new species in this paper, there have been but 24 species described from North America. As yet none of these 55 species are known to occur on both sides of the Atlantic.

The bibliography given in this paper is largely copied from Dr. De Dalla Torre's "Catalogus Hymenopterorum."

### SYNERGUS.

Hartig, Zeitschr. f. Entom. ii. 1840, p. 186, n. 13.

This genus is readily separated from all other Hymenoptera by the closed marginal cell of the wing, the coarsely striated face, the fluted petiole and first abdominal segment, and by the large second abdominal segment, which occupies nearly or quite all of the abdomen.

The species may all be separated into three natural groups as follows:

Antennæ of female 13-jointed.....Group I. 66.
Antennæ of female 14-jointed.....Group II. 69
Antennæ of female 15-jointed.....Group III. 99.

**Group I (Antennæ of female 13-jointed).**

The females of this group may be separated as follows:

A. Thorax entirely black.
  B. Abdomen not distinctly longer than broad.....**atra** n. sp.
  BB. Abdomen distinctly longer than broad.....**dimorphus** O. S.
AA. Thorax and head almost entirely rufous.....**bicolor** Ash.
AAA. Thorax above black.
  B. Mesonotum with long, transverse wrinkles, which are very distinct, somewhat shining.....**dimorphus** O. S.
  BB. Mesonotum indistinctly transversely wrinkled and opaque.
    C. Antennæ not reaching the scutellum.....**medullæ** Ash.
    CC. Antennæ reaching the scutellum.....**liguicola** O. S

**Synergus atra** n. sp.

*Female.*—Color black, with face beneath the eyes, antennæ and legs somewhat yellowish. Head sharply and finely striated beneath the antennæ, vertex and occiput microscopically sculptured and with scattered, broad punctures; antennæ 13-jointed, the last joint once and a half the length of the preceding and conspicuously black, third joint once and a half the length of the fourth; color, except the last joint, yellow; would reach to about the middle of the abdomen. Thorax deep black, opaque, pronotum rather coarsely transversely rugose, especially posteriorly, parapsidal grooves distinct, nearly parallel, foveæ of scutellum small, but shining, disc of scutellum coarsely rugose, collar coarsely rugoso-punctate, mesopleuræ entirely aciculated. Abdomen black, as broad as long, ventral valve projecting, sides of second segment not punctured posteriorly. Legs with tibiæ and tarsi of two anterior pairs yellowish, remaining portions, except at the joints, blackish. Wings with marginal cell closed, areolet very small and indistinct, tegulæ dark brown. Length 2 mm.

*Male.*—Differs from the female by having a smaller abdomen, and in having the antennæ 14-jointed, with the third joint excised and fully as long as the two following together.

Described from four females and three males bred from unknown galls by the writer, at Lansing, Mich., and two females bred from galls of *Holcaspis rubens* Gill. taken at Manitou, Colorado.

Without close examination this species would be taken for small individuals of *Synergus campanula* O. S., but it is readily separated from that species by the coarser sculpturing of the mesonotum, the 13-jointed antennæ of the female, and the much longer third joint as compared with the fourth.

**Synergus dimorphus** O. S.

*Synergus dimorphus* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 376, n. 5, ♀ ♂.
*Synergus dimorphus* Cresson, Synop. Hym. Amer., 1887, p. 180.
*Synergus dimorphus* De Dalle Torre, Cat. Hym. ii, 1893, p. 110.

"*Female.*—0.12 0.13 long. Head black, except the face, which is brownish red mixed with black, below the antennæ; mandibles (except their tip, which is black) and more or less space near their roots on cheeks, yellowish; the brownish coloring of the face extends above the antennæ in the shape of a narrow stripe

along the eyes; vertex black, moderately shining, with sparse, broad, flat-bottomed punctures. Antennæ brownish yellow, 13-jointed, about three-fourths the length of the body; the fourth joint is a little longer than one-half of the third; joints four, five and six are nearly of the same length; the following joints are somewhat shorter; the last joint is about equal to the two preceding taken together. Thorax black, moderately shining, with very rough, but not very dense transverse rugosities; pubescence short and very sparse; parapsidal grooves well marked, punctured at the bottom; scutellum coarsely sculptured: its basal foveæ are indistinct; the smooth space of the pleuræ is almost entirely aciculate; scapulæ brownish yellow. First segment of the abdomen longitudinally striate; the second segment concealing all the following, has the shape of an elongated oval when seen from above; seen from the side its longitudinal diameter distinctly exceeds the transverse one; the ventral valve, ending in a short, pubescent point, usually projects beyond the edge of the second segment, its angle is about 60° or 70°; abdomen polished, black; ventral valve yellowish brown; feet brownish yellow; hind tibiæ and a part of the first joint of the hind tarsi infuscated; tips of all the tarsi brownish; veins of the wings brownish; areolet rather small, its structure like that of the following species (*S. campanula*).

"*Male.*—0.10 long; antennæ 15-jointed, third joint excised below, fourth half as long as the third; head yellow, except a black spot on the vertex, which includes the ocelli; a part of the collare and of the pleuræ also yellow, which color seems to be variable in extent in different specimens; abdomen truncate at the tip, bell-shaped when seen from the side; the sculpture of the head and thorax and the coloring of the feet are the same as in the female."

Baron Osten Sacken did not know the galls from which he obtained his specimens. The specimens in my collection I bred from woody twig galls taken at Lansing, Mich., on red oak and no true gall-flies were reared. The flies issued in large numbers and vary much in color, especially in the females. The females also vary from one and a half to three mm. in length. The darkest of these show a slight rufous coloration only on the lower portion of the face, about the eyes and a small spot in front of the tegulæ; light ones have the whole head, except a dark spot on the vertex, the neck, and a large space on the shoulders, bright rufous as in the males.

This species is quite close to *lignicola* O. S., but differs from that species in having a very coarsely transversely wrinkled mesonotum.

**Synergus bicolor** Ash.

*Synergus bicolor* Ash., Trans. Am. Ent. Soc. xii, 1885, p. 302. ♀ ♂.
*Synergus bicolor* Cresson, Synop. Hymen. Amer. 1887, p. 180.
*Synergus bicolor* De Dalle Torre, Cat. Hymen. ii, 1893, p. 110.

"Length .12–.14 inch. Head, thorax, antennæ and legs yellowish; thorax and legs finely rugoso-punctate; a small brown blotch on vertex of head and a medial stripe on mesoscutum and along the hinder edges; antennæ 15-jointed in male, 13-jointed in female; abdomen polished black; wings hyaline, veins yellowish."

Mr. Ashmead's specimens were bred from the galls of *Andricus foliatus* Ash.

From two types, both males, which Mr. Ashmead has loaned me, I will add the following to the description:

Second abdominal segment entirely without punctures on the side; first, second and third antennal joints conspicuously larger in diameter than those immediately following them, the second joint as long as the fourth, the third joint nearly as long as the fourth and fifth together. The mesonotum is what I have termed coarsely transversely rugose in my descriptions.

**Synergus lignicola** (O. S.)

*Cynips (Synergus?) lignicola* O. S. Proc. Ent. Soc. Phila. i, 1862, p. 252, ♀ ♂.
*Synergus rhoditiformis* Walsh, Proc. Ent. Soc. Phila. ii, 1864, p. 499, n. 22, ♀ ♂.
*Synergus lignicola* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 374, n. 2. ♀.
*Synergus rhoditiformis* Provancher, Nat. Canad. xiv, 1883, pp. 20 and 807, ♀.
*Synergus lignicola* Provancher, Aditt. faun. Canad. Hymen. 1887, p. 165, n. 1.
*Synergus lignicola* Cresson, Syn. Hymen. Amer. 1887, p. 180.
*Synergus lignicola* De Dalla Torre, Cat. Hymen. ii, 1893, p. 112.

"*Female.*—Black. Head with the space behind the eyes (but not the occiput) and also the face below the origin of the antennæ and the mouth, dull yellowish brown varying from dark to pale, the vertex glabrous and moderately polished, the rest of the head opaque and the face finely pubescent. Antennæ nearly as long as the body, 14-jointed, with the last joint scarcely longer than the penultimate, yellowish brown with the two basal joints blackish. Thorax with the collare very finely rugose, the mesonotum before the scutel with coarser transverse waving striæ or rugosities, and with two acute longitudinal striæ converging on the scutel, between the base of which striæ is a shallow, but widely impressed, stria. Scutel rugose, with the two basal foveæ subobsolete; under the wings a small, but highly polished round spot. Abdomen highly polished; the joints succeeding the second concealed by it; the second joint, dorsally, describing a circular arc of thirty degrees. Ventral valve moderate, thin, brownish subhyaline, its tip unarmed and in an angle of forty-five degrees. Sheaths extending a little below or a little above the line of the back, with the ovipositor generally protruding between them. Legs dull pale brown, or brown-black, the trochanters, the knees and the tarsi, except their tips, honey-yellow or dull rufous, each successive pair of legs a little darker than the preceding. Wings hyaline; veins rather fine, the principal ones slightly tinged with brown, the cubitus hyaline and indistinct: areolet moderate, its two basal sides hyaline; radial area about two and a half times as long as wide, distinctly closed by a brownish vein, the areolet placed scarcely more than one-fourth of the way from its basal end. Length of female .08-.10 inch.; male unknown."

From Walsh's description of *rhoditiformis*, which he acknowledged to be only a dark form of *lignicola*, we learn that the antennæ in the male is 15-jointed, and that the last joint in the female antenna is once and a half the preceding, and also that the mesonotum in dark specimens may be entirely black.

Osten Sacken, in his synopsis of the species of *Synergus* in volume iv, of the "Proceedings of the Entomological Society of Philadelphia," p. 373, says that the fourth joint of the female antenna is but little more than one-half the length of the third.

Mr. Walsh's specimens were bred from the galls of *Andricus podagræ* Walsh, and Baron Osten Sacken's from the galls of *Andricus cornigera* O. S.

**Synergus medullæ** Ash.

*Synergus medullæ* Ash., Trans. Am. Ent. Soc. xii, 1885, p. 302, ♀ ♂.

*Synergus medullæ* Cresson, Synop. Amer. Hymen. 1887, p. 180.

*Synergus medullæ* De Dalle Torre, Cat. Hym. ii, 1893, p. 112.

"Length .07–.16 inch., it varying greatly in size. Head and thorax coarsely rugoso-punctate; antennæ 15-jointed in female, 15-jointed in male, they with the head and sides of the collar yellowish; eyes and thorax brown; abdomen black, smooth and shining: wings hyaline, veins yellow."

I have four type specimens of this species sent me by Mr. Ashmead. There is, evidently, a typographical error in the original description, for the three females in my possession all have 13-jointed antennæ. Like other 13-jointed species the third joint is nearly twice the fourth in length. The sides of the second abdominal segment are without punctures.

Specimens of *lignicola* in my possession, which were also sent me by Mr. Ashmead, and which were bred by him from the galls of *Andricus cornigera*, enable me to separate this species from *medullæ* as follows: The parapsidal grooves are much more distinct in *lignicola* than in *medullæ;* in the latter species the antenna is very short, hardly reaching beyond the middle of the mesonotum; in *lignicola* they are decidedly longer, easily reaching the scutellum, and the terminal joint in the female is unusually long, fully as long as the third. In the males, the last joint scarcely, if at all, exceeds the preceding in *medullæ*, while it is nearly twice the penultimate joint in *lignicola*. I also notice in my specimens of female *medullæ* that in no case do the ovipositor sheaths project from the second segment, while in *lignicola* they are considerably protruded and directed upwards.

Group II (Antennæ of female 14-jointed).

A. One-third or more of the posterior lateral portion of the second abdominal segment microscopically punctured.

B. Head and abdomen largely yellowish or rufous.

C. Mesonotum coarsely transversely wrinkled, the wrinkles plainly extending from one parapsidal groove to the other... **oueratus** O. S.

CC. Mesonotum very finely transversely wrinkled, the rugæ broken between the parapsidal grooves.

D. Metathorax and pectus black.

E. Second abdominal segment on tergum, posteriorly, entirely hiding the following segments... ..... **garryana** Gill.

EE. Second abdominal segment on tergum deeply incised, exposing the following segments.

F. Antenna hardly attaining middle of abdomen.....**incisus** n. sp.
FF. Antenna about as long as the body.
G. Mesopleuræ and antennæ black.....**similis** n. sp.
GG. Mesopleuræ and antennæ rufous.....**duricoria** n. sp
DD. Metathorax and pectus rufous.....**ficigeræ** Ash.
BB. Head, except vertex, yellowish; abdomen black.....**erinacei** n. sp.
BBB. Head, except mouth-parts and abdomen, black.....**punctata** n. sp.
AA. Sides of second abdominal segment not punctured, or with a few punctures near posterior margin only.
B. Mesonotum coarsely and densely transversely wrinkled.
C. Third joint of the antenna hardly longer than the 4th.**mendax** Walsh.
CC. Third joint of antenna one and a half times the fourth.
D. Sides of collar and mesopleuræ black.
E. Legs yellow, or slightly infuscated.....**batatoids** Ash.
EE. Legs, at least the hind pair and all the coxæ, black.**atripes** n. sp.
DD. Sides of collar and mesopleuræ yellow.....**mexicana** n. sp.
BB. Mesonotum polished and with a few long, transverse, feebly raised lines. **coniferæ** Ash.
BBB. Mesonotum finely and evenly sculptured, but not distinctly transversely wrinkled.
C. Abdomen as broad as long, second segment not long and pointed.
D. Mesonotum opaque, rugoso-punctate.....**campanula** O. S.
DD. Mesonotum microscopically rugose and moderately shining. **walshii** (**albipes** Walsh).
CC. Second abdominal segment produced, pointed posteriorly, distinctly longer than broad.....**læviventris** O. S.

**Synergus oneratus** (Harr.).

*Cynips oneratus* Harris, Treat. Ins. Mass. 1841, p. 398.
*Cynips oneratus* Harris, Treat. Ins. Inj. Veg., second edition, 1852, p. 434.
*Cynips oneratus* Fitch, Fifth Rept. Ins. N. Y., 1859, p. 810.
*Cynips oneratus* Harris, Treat. Ins. Inj. Veg., third edition, 1862, p 548.
*Synergus oneratus* Walsh, Proc. Ent. Soc. Phila. ii, 1864, p. 498, No. 20.
*Synergus oneratus* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 373, n. 1, ♀.
*Synergus oneratus* Cresson, Syn. Am. Hymen. 1878, p. 180.
*Synergus oneratus* De Dalla Torre, Cat. Hym. 1893, p. 112.

"The gall-fly of the white oak varies in color. Sometimes it closely resembles the gall-fly of our oak apple, differing from it only in size, and in wanting the brownish spot and dark colored veins on the fore wings; and sometimes it is of a dull brownish yellow color, with a brown spot on the back. It is three-twentieths of an inch long, and its wings expand three-tenths of an inch. It is the *Diplolepis*, or more properly *Cynips oneratus*, of my 'Catalogue.'"

The above description being altogether insufficient to distinguish this species, I will add the following:

General color yellowish or rufous, with pectus, spot on vertex, another on pronotum, more or less of the mesonotum and scutellum, the metathorax, the first abdominal segment and the dorsum of the second, the tips of the mandibles and the hind tarsi black or blackish. Antennæ 14-jointed, nearly as long as the body, third joint but slightly longer than the fourth; mesonotum coarsely transversely

wrinkled, parapsidal grooves very distinct; sides of second abdominal segment, posteriorly, densely microscopically punctate. In the male the antenna is 15-jointed and more or less infuscated, and the thorax is almost entirely black. Length from 2 to 3.5 mm.

Baron Osten Sacken says that the black on the mesonotum varies in extent, but that there is always some yellow on the sides of the mesonotum in the female. This is true of all the specimens that I have seen from the eastern part of the country, but I have seven females bred from Colorado galls that are indistinguishable from *oneratus*, except that the mesonotum is entirely black, the only rufous coloration on the thorax being a narrow strip on the collar immediately in front of the tegulæ, and the antenna is black with the joints only rufous. Five males of this Western form have the thorax entirely black in every case, while a single male from Ottawa, Canada, the only other male that I have seen, has the thorax black, except a narrow margin on the propleuræ.

Judging from Harris' description, it seems probable that his specimens came from galls of *Holcaspis globulus*, and it is from this gall that Fitch and Osten Sacken obtained their specimens. My specimens were bred from galls of *Cynips strobilana* O. S. both in Michigan and Iowa, and from galls of *Holcaspis rubens* Gill. and *Dryophanta brevipennata* Gill. taken at Manitou, Colorado, by the writer.

As these Western forms are all constant in their coloration, and are easily separated by it from Eastern specimens, I will suggest for them the varietal name *coloradensis*.

**Synergus garryana** Gill.

*Synergus garryana* Gill., Can. Ent. xxv. 1893. p. 110. ♀ ♂.

"Female.—General color rufous, with tips of mandibles, compound eyes, vertex between ocelli, occiput, lower half of the mesopleuræ, metathorax, pedicel of abdomen and two blotches on second abdominal segment, one next the petiole and one just beyond the middle of the dorsum, black. Head: face entirely yellowish rufous, coarsely striated and sparsely set with short hairs; vertex rugoso-punctate; antennæ 14-jointed, and in color like the face, a little infuscate at the tip. Thorax above a little darker rufous than the face, transversely rugose; parapsidal grooves narrow and rather indistinct, but extending to the collar, sparsely set with short recumbent hairs; scutellum coarsely rugose, the foveæ oblique and shining black at the bottom; mesothoracic pleuræ coarsely aciculate; in two specimens the lower half only is black, and in two others a little smaller, the entire pleuræ are black. Abdomen: petiole coarsely striated; second segment very smooth and shining and finely punctured on outer third. Legs, including coxæ, uniform light yellow, except the tarsi of the hind pair and the tips of the last tarsus in the others, which are black. Wings hyaline, nervures light, areolet obsolete. Length 2.5–3 mm.

"*Male.*—The male differs from the female as follows: Length 2¼ mm.; vertex

above antennæ, except a narrow orbital line, black; antennæ 15-jointed, thorax entirely black; abdomen black, except the tip of the second segment, which is yellowish, and the entire tibiæ of the hind pair of legs, which are slightly blackish."

The above description was made from four females and five males which issued between the 1st and 10th of March from galls resembling those of *Holcaspis monticola* Gill. sent me by Mr. Trevor Kincaid, who collected them from *Quercus garryana* at Olympia, Wash.

This species is very close to *oneratus* and *ficigeræ*, and especially to the latter species, but I find no trouble in separating the specimens in my possession as indicated in the synopsis above.

**Synergus incisus** n. sp.

*Female.*—Colors smoky-yellow and black or blackish. Head smoky-yellow with vertex, down to mandibles, occiput and tips of mandibles black, microscopically rugulose; vertex with scattered broad punctures, eyes not margined with transverse short wrinkles between antennæ and vertex; antennæ 14-jointed, rather short, just about attaining abdomen, feebly clavate, third joint distinctly longer than fourth, terminal joint hardly once and a half the length of the preceding, color yellow. Thorax with mesonotum densely and rather coarsely transversely rugose, especially posteriorly, parapsides present but rather indistinct, scutellum coarsely rugose, foveæ nearly obsolete, color of mesonotum, scutellum and most of pleuræ black or blackish, collar more or less yellow at the sides, pleuræ entirely aciculated. Abdomen punctured on posterior one-half, black at base and on dorsum of second segment, shading into smoky-yellow posteriorly and below, the segments beyond the second largely exposed on the dorsum because of a very deep V-shaped notch in that segment, the exposed segments densely punctured, the ovipositor sheaths protruding and black in color. Legs entirely light yellow, except posterior tarsi, which are somewhat infuscated. Length 2.5 mm.

*Male.*—Differs from the female by having the sides of the collar and the pleuræ yellow, abdomen entirely black, second segment but little incised, antennæ 15-jointed, and by being 1.75-2.25 mm. in length.

Described from three females and ten males bred from the galls of *Andricus frequens* Gill. Collected by the writer at Manitou, Colo.

**Synergus similis** n. sp.

*Female.*—General color yellowish with antennæ, vertex above antennæ, occiput, tips of mandibles, fully half of mesonotum, pectus, pleuræ, metathorax, most of collar, dorsum of second abdominal segment, ovipositor sheaths, a line on outside of all the tibiæ, and the tarsi black or blackish. Head entirely minutely sculptured, on vertex with numerous very broad punctures back of the ocelli and with coarse wrinkles outside the ocelli running parallel with the margins of the eyes; antennæ 14-jointed, nearly as long as the body, third and fourth joints about equal, and the fifth and sixth hardly shorter, not at all clavate towards the tip, terminal joint about once and a half as long as the preceding. Thorax, with mesonotum, very finely and evenly rugoso-punctate, appearing as feeble transverse rugæ under a half inch objective, parapsidal grooves weak. The 1st

margins of the mesonotum, a line along each parapsidal groove, the entire space between the grooves posteriorly and the scutellum rufous; the rest of the mesonotum black, foveæ of the scutellum weak, mesopleuræ entirely aciculated, black. Abdomen yellow, with a shining black blotch or dorsum, densely punctured on posterior one-half of second segment; this segment somewhat incised on dorsum, exposing the following segments (in one example the third and following segments are retracted under the second and the ovipositor sheaths are left standing out away from the abdominal segments), ovipositor sheaths attaining the dorsal line. Feet light honey-yellow, except as mentioned above. Length 2.75-3.5 mm.

Described from four females bred from the galls of *Holcaspis brevipennata* Gill. from Manitou, Colo.

This species is separated from *oneratus* O. S., which it very closely resembles by the finer sculpturing of the mesonotum, and in the absence of the short, coarse wrinkles margining the eyes just above the antennæ, which are quite pronounced in that species.

**Synergus duricoria** n. sp.

*Female.*—Yellow, with tips of mandibles, a small spot on vertex, neck, pectus, dorsum of metathorax, first and second abdominal segments, ovipositor sheaths, a line on the upper side of hind tibiæ and hind tarsi, black or blackish. Head: face very sparsely and weakly pubescent, vertex and occiput very minutely rugulose and with numerous broad shallow punctures; antennæ 14-jointed, very nearly as long as the insect, third and fourth joints nearly equal, fifth and sixth hardly shorter, the terminal joint nearly equal to the two preceding, flagellum not at all clavate. Thorax very finely, evenly and densely rugose on mesonotum, parapsides weak, but plainly visible throughout; scutellum with two distinct, but rather shallow transverse foveæ. Abdomen densely punctured at sides posteriorly, second segment deeply notched on dorsum posteriorly, exposing the following segments and the ovipositor sheaths. Wings hyaline, with main veins quite black, areolet small and nearly obsolete. Length 4 mm.

Described from a single female bred from the galls of *Holcaspis duricoria* Bass. that were sent me by Mr. F. M. Jones, of Wilmington, Del.

**Synergus fleigeræ** Ash.

*Synergus fleigeræ* Ash., Trans. Am. Ent. Soc. xii, 1885, p. 301. ♀ ♂.

*Synergus fleigeræ* Cresson, Syn. Am. Hymen. 1887, p. 180.

*Synergus fleigeræ* De Dalla Torre, Cat. Hymen. 1893, p. 111.

"Length .08–.14 inch. Head and thorax reddish brown, punctate, the punctures coarser on thorax, slightly pubescent; antennæ 13-jointed in female, 15-jointed in male, yellowish; abdomen yellow, testaceous, with a large black blotch on disc; legs yellow, posterior tibiæ brown along the upper edge; wings hyaline, veins brown."

I have two of Mr. Ashmead's types in my possession, both of which are females, and both have, unmistakably, 14-jointed antennæ. The species is closely related to *oneratus*, and plainly belongs to the 14- and not to the 13-jointed group.

Mr. Ashmead's specimens were bred from the galls of *Holcaspis ficigera* Ash.

**Synergus erinacei** n. sp.

*Female.*—Thorax, abdomen, eyes, vertex, occiput and tips of mandibles black; orbits of eyes, entire antennæ and legs and tegulæ yellow, the legs being especially pale. Head minutely sculptured with broad, shallow punctures, especially abundant and distinct about the ocelli, mandibles tridentate, the terminal tooth being long and pointed; antennæ 14-jointed, and as long as the entire body, second joint rather long, third and fourth joints of about equal length, the terminal joint but little longer than the preceding. Thorax finely, transversely rugoso-punctate, but not distinctly transversely wrinkled, the parapsidal grooves are very distinct throughout their entire course, the two parallel lines from the anterior dorsal margin of the mesonotum are distinct, but short; scutellum coarsely rugose and with two small and approximate and very distinct foveæ; mesothoracic pleuræ entirely finely aciculate. Abdomen about as broad as long, rounded off (not pointed) posteriorly, the hind third microscopically punctured, ventral valve prominently projecting, the ovipositor sheaths directed upwards and slightly projecting. Legs, including the coxæ, pale yellow. Wings hyaline, veins slender and pale, areolet large and nearly obsolete. Length 3 mm. to the tip of the abdomen.

*Male.*—Differs from the female in being about one-half mm. shorter, in having the antennæ 15-jointed, and in having the head entirely pale yellowish, except a large black blotch on the vertex.

Described from one female bred by the writer from a gall of *Acraspis erinacei* Walsh at Ames, Ia., and from thirteen females and two males bred from galls of the same insect sent me by Mr. F. E. Moeser, of Buffalo, N. Y.

The specimens are all remarkably uniform in size and coloration.

**Synergus punctata** n. sp.

*Female.*—Black, bases of mandibles and portions of face immediately adjoining, legs, antennæ, and tegulæ yellowish. Head: vertex very minutely sculptured, moderately shining, the ocelli rufous in color, antenna 14-jointed, third joint but little longer than the fourth, last joint but little longer than the penultimate. Thorax: mesonotum finely rugose, but little shining, parapsidal grooves distinct posteriorly, but hardly traceable anteriorly, the two parallel ridges extending back from the collar are very distinct; scutellum coarsely rugose, foveæ shallow and rough at the bottom, lower portion of mesothoracic pleuræ finely aciculate with a large, smooth, triangular spot beneath the base of the wings. Abdomen black, microscopically punctured on posterior half of second segment, as broad as long, ventral valve usually protruding. Legs, including the coxæ, pale yellowish. Wings hyaline, nervures pale, areolet scarcely visible. Length 1.50–2.25 mm.

*Male.*—Differs from the female by having lower face and genæ yellow, antennæ 15-jointed, third joint about one and one-half times the fourth. Length 1.25–1.50 mm.

Described from twenty-four females and twenty-two males bred from galls of *Holcaspis rubens* Gill. and *Dryophanta glabra* Gill. all taken at Manitou, Colo.

Three males bred from galls resembling those of *Holcaspis monticola* Gill. and sent me by Mr. Trevor Kincaid, of Olympia, Wash., differ from the specimens bred here by having the hind tibiæ blackish in color. Five males from Ames, Ia., seem to differ only in having the sides of the abdomen somewhat less punctured.

**Synergus mendax** Walsh.

*Synergus mendax* Walsh, Proc. Ent. Soc. Phila. ii, 1864, p. 498, n. 21, ♀.
*Synergus mendax* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 378, n. 7, ♀.
*Synergus mendax* Cresson, Syn. Am. Hymen. 1887, p. 180.
*Synergus mendax* De Dalla Torre, Cat. Hymen. ii, p. 112.

"*Female.* – Black. Head, with the space behind the eyes (but not the occiput), and also the face below the origin of the antennæ and the mouth, dull yellowish brown varying from dark to pale, the vertex pale and moderately polished, the rest of the head opaque and moderately pubescent. Antennæ nearly as long as the body, 14-jointed with the last joint hardly longer than the penultimate, yellowish brown with the two basal joints blackish. Thorax with the collare very finely rugose, the mesonotum before the scutel with coarser transverse waving striæ or rugosities, and with two acute longitudinal striæ converging on the scutel, between the bases of which striæ is a shallow, but widely impressed fovea; scutel rugose, with the two basal foveæ subobsolete; under the wings is a small, but highly polished round spot. Abdomen highly polished; the joints succeeding the second concealed by it; the second joint dorsally describing an arc of 30°; ventral valve moderate, thin, brownish subhyaline, its tip unarmed and at an angle of 45°; sheaths extending a little below or above the line of the back, with the ovipositor generally protruding from between them. Legs dull pale brown or brown-black, the trochanters, the knees and the tarsi, except their tips, honey-yellow or dull rufous, each successive pair of legs a little darker than the preceding. Wings hyaline, veins rather fine, the principal ones lightly tinged with brown, the cubitus hyaline and indistinct; areolet moderate, its two basal sides hyaline; radial area about two and a half times as long as wide, distinctly closed by a brownish vein, the areolet placed scarcely more than one-fourth of the way from its basal end. Length: female .08–.10 inch.; male unknown."

Mr. Walsh's specimens were bred from the galls of *Andricus podagræ*. I have eleven specimens of this species that I bred from an unknown twig gall upon *Quercus rubra* at Lansing, Mich. Six of these are males, and may be distinguished from the females as follows: Length .06 of an inch; head (except vertex and occiput), antennæ and entire legs, light straw-yellow; thorax and abdomen deep black.

**Synergus batatoides** Ash.

*Synergus batatoides* Ash., Trans. Am. Ent. Soc. xii, 1885, p. 301, ♀ ♂.
*Synergus batatoides* Cresson, Syn. Am. Hymen. 1887, p. 180.
*Synergus batatoides* De Dalla Torre, Cat. Hym. ii, 1893, p. 109.

"Length .12–.14 inch. Head, antennæ and legs, yellowish; head punctate, with a brown blotch on vertex; antennæ short, 14-jointed in female, 15-jointed in male. Thorax and abdomen black, the latter polished, the thorax is coarsely punctate and finely pubescent. Wings hyaline, veins brown."

This species resembles *S. leviventris* quite closely, but is easily separated from that species by the larger size and the different sculpturing of the mesonotum as indicated in the synopsis of species.

**Synergus atripes** n. sp.

*Female.*—Black, with antennæ, lower face, genæ, tegulæ and portions of anterior and middle femora and tibiæ rufous or deep smoky, face above antennæ and vertex minutely rugulose and rather thickly set with broad shallow punctures, antennæ short, hardly reaching to middle of second abdominal segment, third joint nearly twice the fourth, joints 4 to 14 all subequal, not at all clavate. Thorax with mesonotum rather coarsely transversely wrinkled, parapsides rather indistinct; scutellum coarsely rugose, foveæ obliterated, mesopleuræ entirely aciculated. Abdomen black, without punctures, or with a few feeble ones near the posterior margin only, second segment produced dorsally, making it pointed and sublanceolate when viewed from the side, segments back of the second and the ovipositor sheaths entirely covered, the ventral valve slightly protruding; marginal cell of wing short and triangular, areolet small and nearly obsolete. Length 2–3 mm.

Males differ in having antennæ 15-jointed, and in being from 2–2.5 mm. long.

Described from ten females and six males bred from the galls of *Holcaspis brevipennata* Gill. that were taken at Manitou, Colo.

**Synergus mexicana** n. sp.

*Female.*—Head, except tips of mandibles and vertex, yellowish; mesonotum yellow, abdomen black, antennæ yellow, legs yellowish beneath, blackish above; metanotum densely and coarsely transversely wrinkled; scutellum coarsely and irregularly wrinkled with foveæ almost obsolete; mesopleuræ entirely striated and opaque, abdomen deep shining black without punctures on posterior half of second segment; second segment rounded off, not pointed posteriorly. The antennæ are 14-jointed, and the third joint about equals the fourth and fifth together in length.

Described from a single female sent me by Mr. T. D. A. Cockerell, of Las Cruces, New Mex.

This species comes most nearly to *S. batatoides* Ash.

**Synergus coniferæ** Ash.

*Synergus coniferæ* Ash., Trans. Am. Ent. Soc. xii. 1885, p. 301. ♀ ♂.
*Synergus coniferæ* Cresson. Syn. Am. Hymen. 1887, p. 180.
*Synergus coniferæ* De Dalla Torre, Cat. Hymen. ii, 1893, p. 110.

"Length .10 inch. Reddish brown, punctate and finely pubescent, the pubescence being quite thick on the face: antennæ 14-jointed, reaching to the base of the abdomen; thorax transversely wrinkled with parapsides distinct; abdomen at base testaceous; posterior femora and intermediate and posterior tibiæ along upper edges brown; wings hyaline, veins pale."

The peculiar sculpturing of this species readily separates it from any other described species (see synopsis).

**Synergus campanula** O. S.

*Synergus campanula* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 376, n. 4, ♀.
*Synergus campanula* Cresson, Syn. Am. Hymen. 1887, p. 180.
*Synergus campanula* De Dalla Torre, Cat. Hymen. ii, 1893, p. 110.

"Female 0.08-0.10 long. Head black, except the face, which is brownish below the antennæ and brownish yellow above the mouth; the brownish or yellowish coloring sometimes extends above the antennæ in the shape of a narrow stripe along the eyes; vertex black, little shining, smooth. Antennæ brownish yellow, a little shorter than the body, 14-jointed (♀); the fourth joint is a little shorter than the third, the following joints gradually decreasing in length; the fourteenth is about once and a half the length of the preceding joint. Thorax deep black and but little shining, with dense, delicate rugæ, evenly spread over its upper surface, which is also clothed with a short, fine and scattered pubescence; parapsidal grooves not very deep but distinct; a vestige of an intermediate furrow, especially visible in a certain light towards the scutellum; two minute, parallel, glabrous lines, running a short distance from the middle of the collare, backwards (they are visible under a strong lens only); scutellum rather large gibbose, densely and deeply rugose; its basal foveæ rather small; pleuræ with a smooth, polished, black space, the lower part of which is finely aciculate; scapulæ yellow; first segment of the abdomen longitudinally striate; the second segment concealing all the following, has the shape of a regular oval when seen from above: seen from the side its longitudinal diameter is about equal to its transverse one; its outline is almost that of half a circle, which has a flat arc (the dorsal side of the segment) instead of a diameter; the ventral valve or the tip of the sheath of the ovipositor are sometimes, but not always, protruding beyond the hind edge of the second segment; the abdomen is polished black, sometimes brownish along the hind edge; feet brownish yellow, tips of the tarsi brown; veins of the wings pale; areolet of medium size, almost obsolete, as one side of it only (the prolongation of the second transverse vein) is short and distinct."

Baron Osten Sacken's specimens were bred from galls of *Holcaspis globulus* Fitch and similar galls, probably those of *H. duricoria* Bass. from *Quercus bicolor*.

I have a number of specimens bred from galls of *Holcaspis duricoria* Bass. sent me by Mr. F. E. Moesier, Buffalo, N. Y., and a few specimens bred from galls of *Biorrhiza forticornis* Walsh, collected by Mr. C. F. Baker at St. Croix Falls, Wis.

**Synergus albipes** (Walsh).

*Synophrus albipes* Walsh, Proc. E. S. Phila. ii, 1864, p. 479 and 496, n. 17. ♀ ♂.
*Synergus albipes* Cresson, Syn. Am. Hymen. 1887, p. 180.
*Synergus lanæ* De Dalla Torre, Cat. Hymen. ii, 1893, p. 111.

"Differs from *læviventris* O. S. only as follows: First. The entire body, including the head, with the exception of the palpi which are whitish or pale yellowish, is always black. Second. The antennæ of the female are 14-jointed (not 13-jointed), the last joint one-third longer than the preceding one. Third. The second abdominal joint always covers the terminal joints both in male and female. Fourth. The legs are whitish, scarcely tinged with yellow, with the tarsal tips brown, but otherwise immaculate in a single male, where the hind femora and

tibiæ, and in a less degree the intermediate ones are brown. Fifth. The sheaths of the ovipositor do not project beyond the line of the back, or scarcely, and in a single female only, though the ovipositor often projects from between them, which is not seen in any of my five *læviventris* females. Length of male .04-.07 inch.; female .07-.09 inch.

"Twelve males and eight females bred from the galls of *Q. floggi* (equals *Q. lana?* Fitch) on the 4th of August, when I obtained 41 males, 5 females, and other specimens August 1st and after August 4th, all from galls of the preceding year's growth. Hence it would seem that this species is not double brooded like *læviventris*."

Mr. Cresson, in his "Synopsis of the Hymenoptera," etc., published in 1887, make this species synonymous with *lanæ* Fitch, which I think is a mistake. In *lanæ* the head, except the vertex, is straw-colored, while in *albipes* it is all black; in *lanæ* the second abdominal segment does not completely cover the succeeding, while in *albipes* it does; in *lanæ* the females are 15-jointed, while in *albipes* they are but 14-jointed. I have both species in my collection, and they are very distinct.

As the name *albipes* was preoccupied for an European species by Hartig, I will suggest for Walsh's species the name *walshii*. My specimens were bred from galls taken at Lansing, Mich., but what galls I do not know.

**Synergus leviventris** O. S.

*Synophrus læviventris* O. S., Proc. Ent. Soc. Phila. i, 1861, p. 57, ♀ ♂.
*Synophrus læviventris* Walsh, Proc. Ent. Soc. Phila. ii, 1864, p. 494, n. 16, ♀ ♂.
*Synergus læviventris* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 375, n. 3.
*Synergus læviventris* O. S., Proc. Ent. Soc. Phila. v, 1867, p. 380.
*Synergus læviventris* Cresson, Syn. Am. Hymen. 1887, p. 180.
*Synergus leviventris* De Dalla Torre, Cat. Hymen. ii, 1893, p. 111.

"Female 0.07-0.08 long. Head reddish brown, vertex darker, antennæ brownish yellow, second joint not much shorter than the fourth, the third about one-third longer than the fourth; joints four, five and six of about equal length; the fourteenth, or last joint, is somewhat less than once and a half the preceding; thorax black and moderately glossy, finely rugoso-punctate and pubescent; scutellum gibbose with a slight, sharp, recurved, elevated margin (thorax and scutellum in older specimens often becoming brownish or reddish brown); parapsidal grooves distinct their whole length; foveæ at the base of the scutellum rather small, but distinct; pleuræ black or brownish, polished and glossy under the root of the wing, aciculate below, punctate anteriorly; first abdominal segment striate; the second segment, covering all the following, is chestnut-brown or black, paler on the under side; its shape, seen from above, is elongated-ovoid, the tip being drawn out in a point; the side view is almost lanceolate, the top appearing pointed; held against the light, the valves of the ovipositor, as well as the ventral valve, may be seen, concealed as they are under their unusually long second joint; the ovipositor, alone, protrudes sometimes beyond the joint; feet brown-

ish yellow, extreme tip of tarsi more or less brownish (one of my specimens has the hind tibiæ and tarsi somewhat infuscated); wings hyaline, veins pale: areolet almost obsolete, as one side of it only (which is the prolongation of the second transverse vein) is stout and distinct; the two other sides, as well as the whole course of the cubital vein, are almost obsolete."

This species was bred by both Walsh and Osten Sacken from the galls of *Amphibolips spongifica* O. S., and Osten Sacken also bred it from *Holcaspis centricola* O. S. I have quite a number of specimens in my collection that I bred from *Holcaspis globulus* Fitch in Michigan and from *Holcaspis rubens* Gill. collected at Manitou this State.

Group III (Antennæ of Females 15-jointed).

Only three species have been described in this group, and they may be separated as follows:

A. Thorax coarsely transversely wrinkled.....**magnus** Gill.
AA. Thorax finely sculptured, not distinctly transversely wrinkled.
B. Abdomen blackish throughout; small species, not exceeding 2.5 mm. **lanæ** Fitch.
BB. Abdomen largely yellow; large species, exceeding 2.5 mm..**villosus** Gill.

**Synergus magnus** Gill.

*Synergus magnus* Gill., Bull. Ill. Lab. Nat. Hist. iii, 1890, p. 202, ♀.
*Synergus magnus* De Dalla Torre, Cat. Hymen. ii, 1893, p. 112.

"Head rufous yellow, vertex and thorax entirely black, abdomen rufous yellow, except a narrow black stripe along the tergum of the second segment, feet light yellow, except the tibiæ and tarsi of the hind pair, which are infuscate. Length 4 mm.

"Head: face coarsely striate, vertex and occiput microscopically rugulose and with broad punctures; antennæ black, as long as the insect, 15-jointed, third joint but little longer than the fourth. Thorax with coarse, transverse wrinkles, parapsides distinct throughout, median groove reaching the posterior ends of the parallel lines; the lateral grooves appear more like ridges, and are short and oblique; shoulders coarsely wrinkled, pleuræ very coarsely aciculated below and very finely aciculated above, with a smooth, shining spot midway upon the most prominent part; scutellum with two small foveæ and coarsely rugose. Abdomen: first segment, as well as the petiole of the metathorax, coarsely wrinkled or fluted, second segment occupying nearly the whole surface of the abdomen, ovipositor sheaths long and projecting upward above the line of the tergum, venter considerably projecting. Wings long, narrow and slightly smoky, areolet medium."

The above description was made from a single female bred from the galls of *Amphibolips cookii* Gill. gathered at Lansing, Mich.

**Synergus lanæ** (Fitch).

*Cynips quercus lanæ* Fitch, Fifth Rep. Ins. N. Y. 1859, p. 814, n. 316.
*Cynips quercus lanæ* O. S., Proc. Ent. Soc. Phila. i, 1861, p. 62, n. 10.
*Cynips quercus lanæ* O. S., Stettin. Ent. Zeitg. xxii, 1861, p. 409, n. 9.
*Cynips quercus lana* O. S., Proc. Ent. Soc. Phila. iv, 1865, p. 359, n. 45.
*Andricus lana* Ashmead, Trans. Am. Ent. Soc. xii, 1885, p. 295.
*Synergus lana* Cresson, Synop. Am. Hymen. 1887, p. 180.
*Synergus lanæ* De Dalla Torre, Cat. Hymen. ii, 1893, p. 111.

Fitch's very brief description of this species is as follows:

"Small black flies with white or straw-colored heads, antennæ and legs, and with shining smoky yellow abdomens, having a black or blackish cloud occupying their back and sides, the females with 15-jointed antennæ, and their length 0.09."

I have two apparently typical specimens of this species which I bred from the galls of *Andricus flocci* at Ames, Iowa.

To Fitch's description I will add the following:

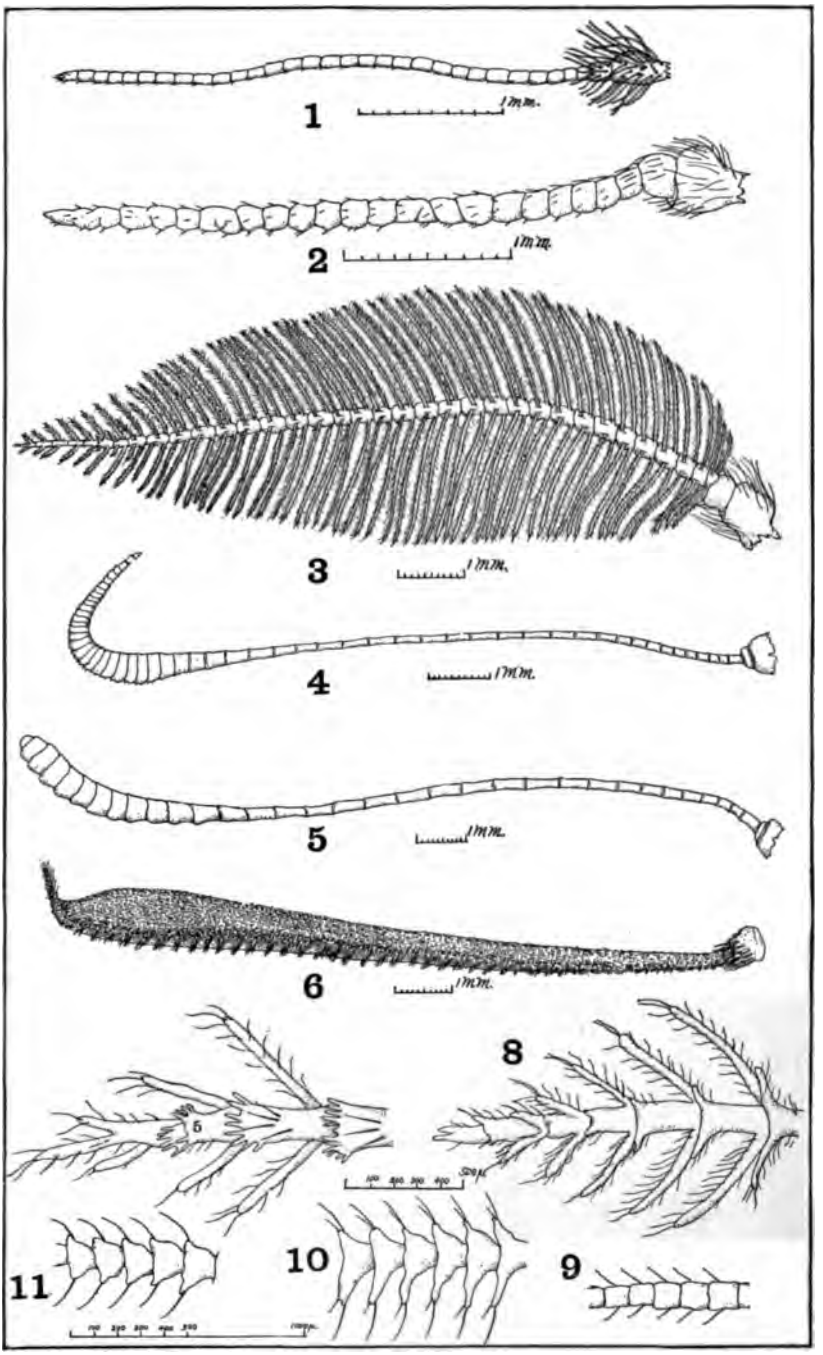
The only black on the head is on the vertex and the tips of the mandibles; the only light coloration upon the thorax is along the parapsidal grooves themselves, which are rufous; the mesonotum is moderately shining and very finely and evenly sculptured; the foveæ of the scutellum are rather large and shining; the abdomen is black, shading into smoky brown posteriorly and beneath, and is as broad as long and rounded off posteriorly, not prolonged in a point; the second segment not quite covering the third and fourth, the second segment without punctures, the ovipositor sheaths and ventral valve prominently exposed.

**Synergus villosus** Gill.

*Synergus villosus* Gillette, Bull. Ill. Lab. Nat. Hist. iii, 1890, p. 202, ♀.
*Synergus villosus* De Dalla Torre, Cat. Hymen. ii, 1893, p. 114.

"The front, above the insertion of the antennæ, the vertex, a broad stripe extending over the occiput to the collar, the entire thorax, a broad blotch on the second abdominal segment extending far down at the sides, the tips of the mandibles, and a spot upon the tergum of the fifth abdominal segment black; feet, including the coxæ, light yellow, orbits and antennæ slightly rufous, other parts light yellow. Head: face rather finely striate, vertex and occiput with numerous coarse punctures on a microscopically sculptured surface, antennæ 15-jointed, nearly as long as the body. Thorax: mesonotum with fine transverse ridges, the furrows between bearing coarse, but shallow and somewhat confluent punctures, parapsidal grooves very distinct, median groove narrow and extending but a short distance, parallel lines and lateral furrows not very distinct, pleuræ coarsely aciculated below, finely above and with a smooth median spot; scutellum bifoveate, rather coarsely sculptured, foveæ shallow, the sculpturing somewhat obscured by pubescence. Abdomen: first joint, as well as petiole of metathorax, fluted, second segment occupying nearly the entire surface of the abdomen, venter rather prominent. Wings hyaline, areolet rather indistinct.

"Described from two specimens (♀) bred from the galls of *Acraspis villosus* Gill. taken in Iowa."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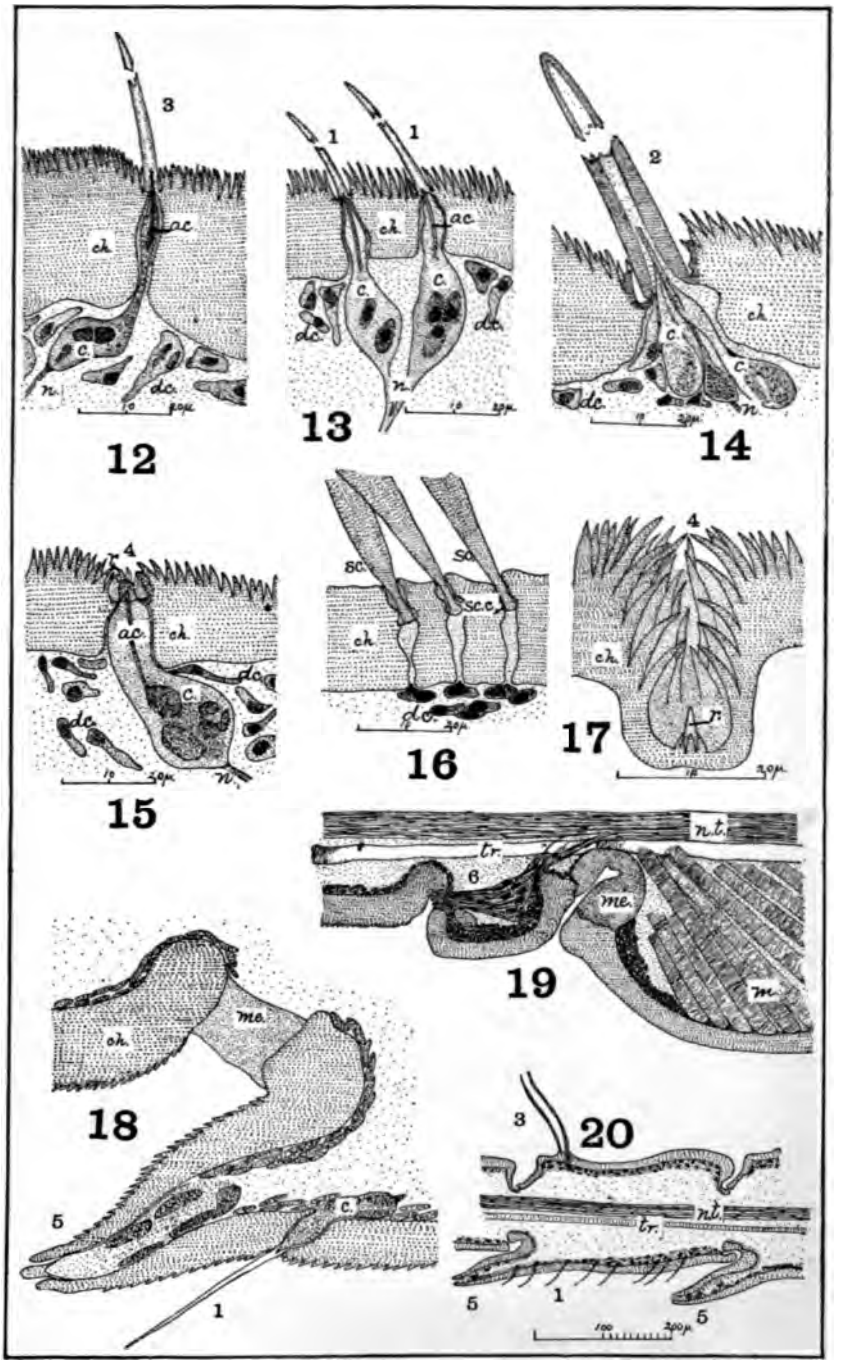
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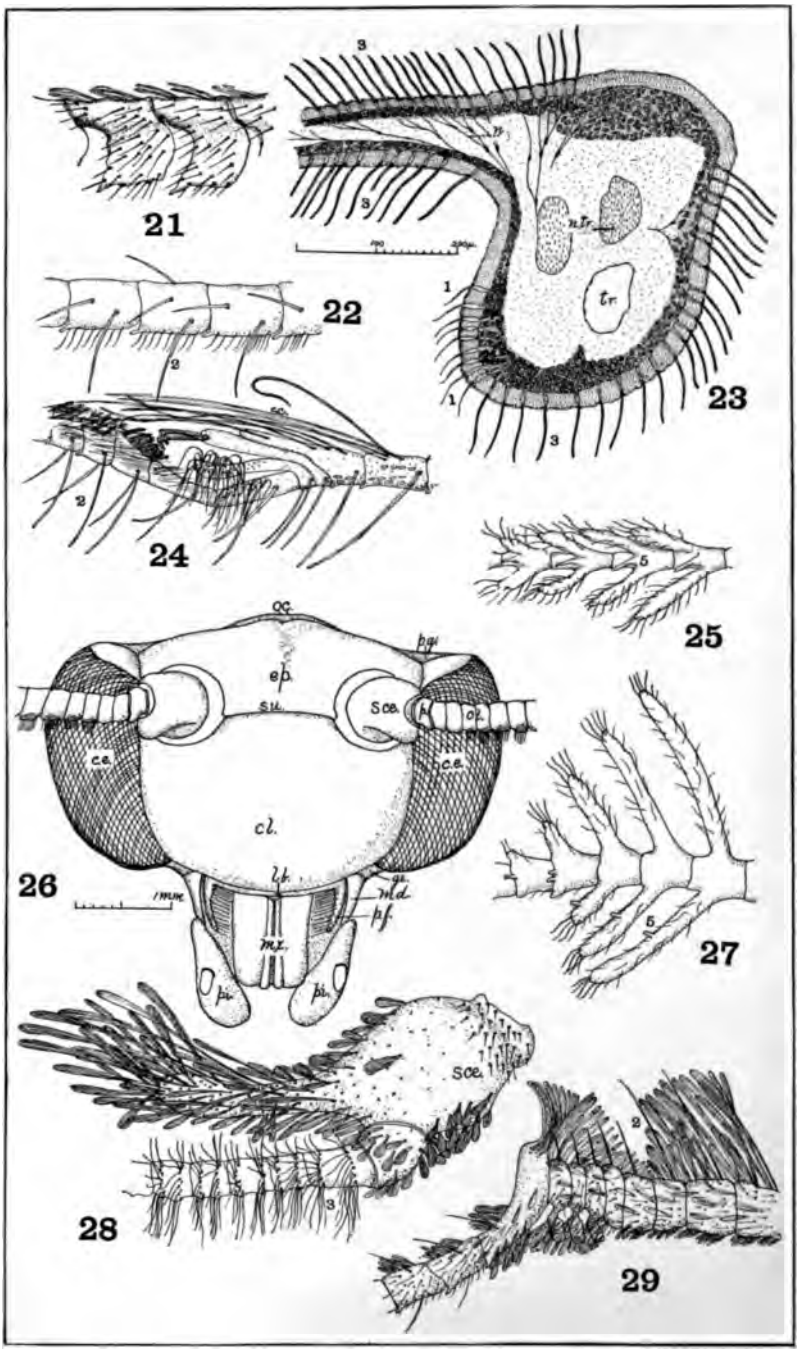
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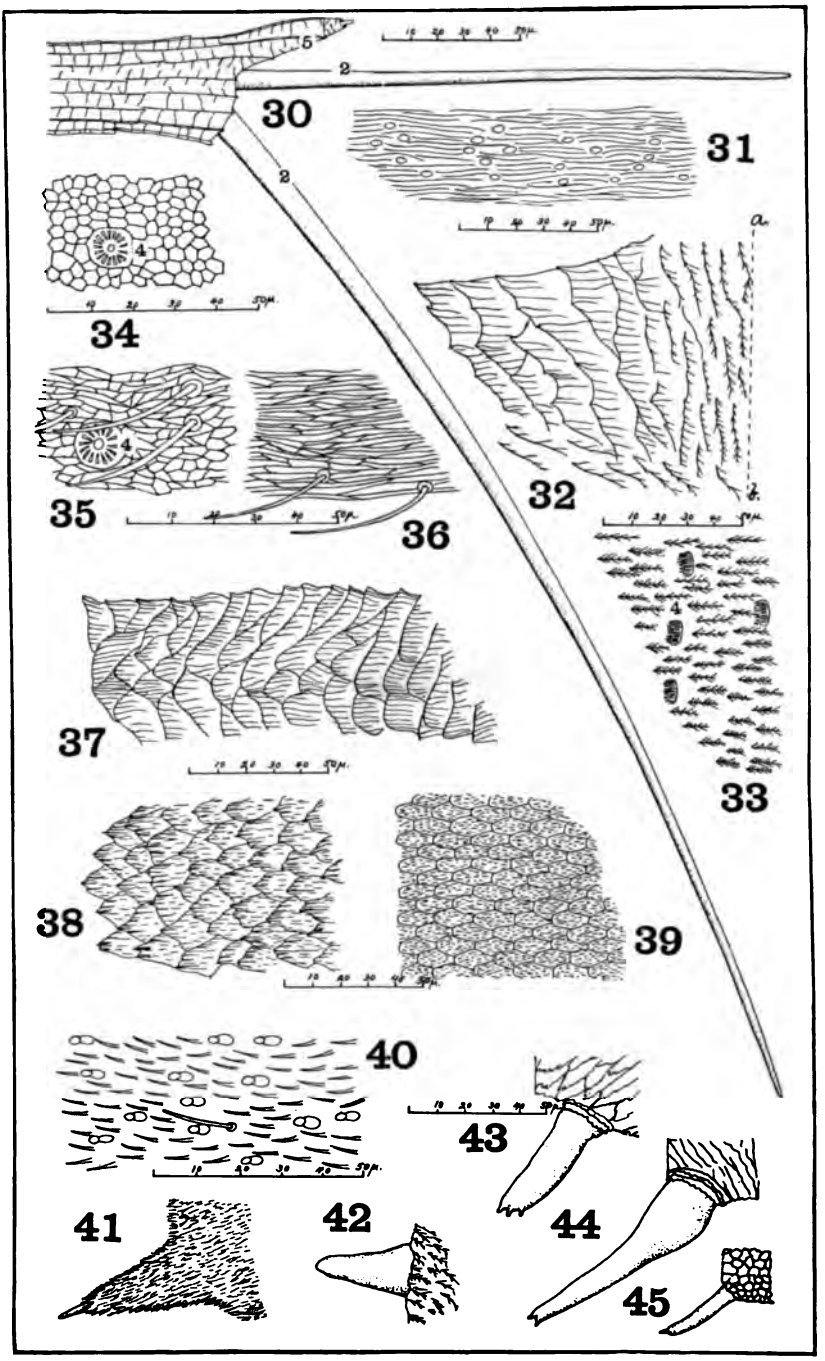
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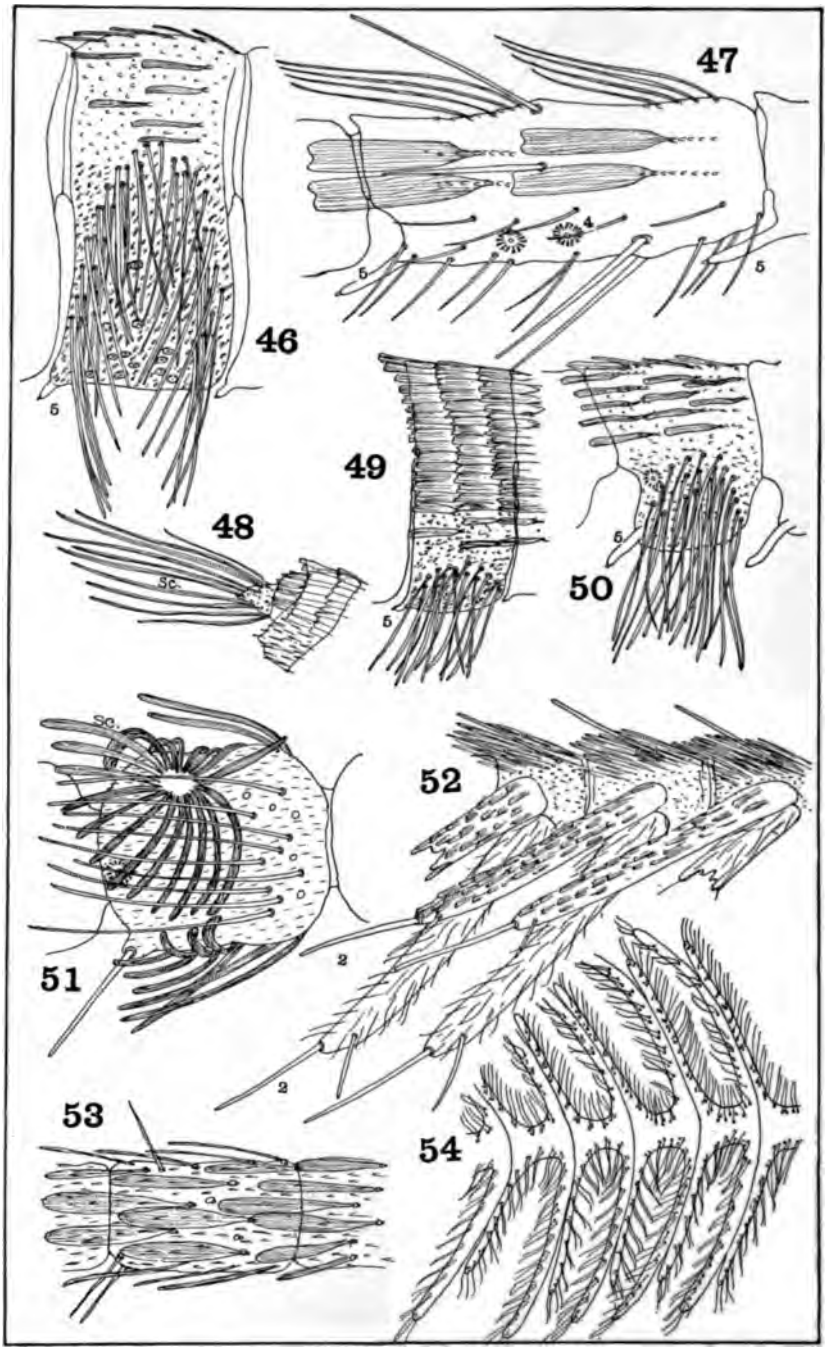
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# THE LAMIINÆ OF NORTH AMERICA.

BY CHARLES W. LENG, B.S., WITH NOTES AND DESCRIPTIONS
BY JOHN HAMILTON, M.D.

After spending much time and bestowing much labor on the present work, Mr. Leng was compelled to abandon its further prosecution by causes beyond his control. All work done was placed in the hands of the writer to use as might be thought best. Mr. Leng had the paper prepared for the press as far as *Leptostylus*, and that part is published from his manuscript. From *Leptostylus* onward the most of the tables, bibliography and distribution, were furnished by Mr. Leng. What remained to be done was the completion of these and the furnishing of descriptive notes under the species; this is represented in the text by the matter inclosed in square brackets. The writer is responsible for all following the close of the synopsis proper, being notices of synonymy and species introduced or described since 1884, the date of the commencement of the synopsis of the Cerambycidæ. As this paper is likely to fall into the hands of many who have not access to detailed systematic descriptions, to make it useful to such the salient features of each species are given, being taken from the insects themselves, except when not obtained.

JOHN HAMILTON.

ALLEGHENY, PA.,
*March* 18, 1896.

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## *Preliminary Remarks by Mr. Leng.*

Since 1767, when Linné described *Lagocheirus araneiformis*, the number of our Lamiinæ described has continually increased, and owing to the scarcity of the books containing them, the descriptions are accessible to but few students. The object of the present paper is to bring together these descriptions and thus complete the series commenced some years ago in the Bulletin of the Brooklyn Entomological Society. All the genera containing numerous species have been recently treated in synoptic form by Dr. Horn, and they will therefore be but briefly copied here. For a more detailed study the reader is referred to the original papers, viz.: "Notes on some genera of Cerambycidæ of the United States," Trans. Am. Ent. Soc. vii,

1878; "Notes on some genera of Cerambycidæ with descriptions of new species," Trans. viii, 1880; and "Descriptions of some new Cerambycidæ with notes," Trans. xii, 1885.

In the study of this subfamily the specimens that accumulate display differences in color, in punctuation and in vestiture, that do not always indicate specific difference. The influence of climate and of the food-plant is very marked, and the variation thereby occasioned has led to the description of some species that are now considered races or synonyms. Where slight difference in color, etc., accompany difference in food-plant or locality I have considered them indicative of races; where these differences, though they may seem of considerable import when only two extremes are compared, are connected by intergrades I have considered them as indicative of individual variation. Should the reader possess only the two extremes, I beg him to believe that the intergrades, nevertheless, do exist.

It is a pleasure to acknowledge the assistance I have received from Mr. Frederick Blanchard and Dr. John Hamilton, to whom I owe many of my specimens; to Mr. Samuel Henshaw, who has revised the lists of localities given; and to Dr. Horn, who has allowed me to use his collection and library, and, in addition, has given much advice throughout the paper.

The tribes represented in our fauna are arranged in series, as follows:

I. Humeral angles not prominent; metasternum short; wings wanting; front tibiæ sulcate.....**DORCADIOIDES.**

A. Front large, palpi slender.

Support of labrum distinct, coriaceous.....**I. Dorcadiini.**

Support of labrum not visible.....**II. Monilemini.**

II. Humeral angles distinct; wings perfect; elytra entire; front tibiæ sulcate.

A. Body small, elytra gibbous or spinous near the base; prothorax constricted behind, front large, inflexed; ungues divergent.**CYRTINOIDES.**

Front coxal cavities rounded.....**III. Cyrtinini.**

Front coxal cavities angulated.....**IV. Psenocerini.**

B. Body elongated, usually large, elytra not gibbous; scape of antennæ with an apical cicatrix (except *Dorcaschema*); front coxal cavities angulated, sometimes a little open behind; eyes rather finely granulated; ungues usually divaricate, but variable....**LAMIOIDES.**

**V. Monohammini.**

C. Ungues divergent.

a. Scape of antennæ with an open apical cicatrix; front coxal cavities angulated, middle coxæ open; eyes finely granulated; body broad.

**MESOSOIDES.**

**VI. Mesosini.**

b. Scape of antennæ without cicatrix; front coxal cavities variable, middle open ..... ONCIDEROIDES.
Front large, flat; front coxæ angulated ..... X. Onciderini.
Front convex; front coxæ nearly rounded; eyes very coarsely granulated. XI. Ataxiini.
Front inflexed, form very elongate ..... XII. Hippopsini.
D. Ungues divaricate; scape of antennæ without cicatrix.
a. Front coxæ rounded, middle coxæ closed, or nearly so; form usually stout. ACANTHODEROIDES. VII. Acanthoderini.
b. Front coxæ angulated, middle coxæ open ..... POGONOCHEROIDES.
Support of labrum coriaceous ..... VIII. Pogonocherini.
Support of labrum not visible ..... IX. Desmiphorini.
c. Front coxæ protuberant, subconical, cavities angulated. middle coxæ open externally; eyes very finely granulated; form cylindrical, prothorax never armed, rarely tuberculate on the sides. SAPERDOIDES.
Ungues simple (except the outer one of front and middle tarsi in certain males) ..... XIII. Saperdini.
Ungues cleft or appendiculate ..... XIV. Phytoeciini.
III. Humeral angles distinct, wings perfect, elytra abbreviated; front tibiæ not sulcate; claws divaricate ..... METHIOIDES.
a. Front coxal cavities angulated, widely open behind; middle coxal cavities open externally; front short, eyes very large, coarsely granulated; oral organs atrophied ..... XV. Methiini.

The arrangement of tribes stated above is copied from the "Classification," except that the Michthysomini are omitted; the reasons for this course appear below.

### MICHTHYSOMA LeConte.

**M. heterodoxum** Lec., 1852, Journ. Ac. Phil. ser. 2, ii. p. 30.
Length 6-8 mm.; .24-.32 inch. *Habitat.*—Georgia, North Carolina, Virginia.

This insect has been very rare in collections, only two or three specimens until recently being known. I owe mine to the kindness of Mr. Blanchard, who found several specimens near Highlands, N. C., running on the branches of oaks. It is black, the head and prothorax densely coarsely punctured, the elytra less densely punctured, shining, with short hairs proceeding from the punctures. The prothorax is as wide as the head, with an acute lateral spine rather in front of the middle. The resemblance to *Monilema* and *Cyrtinus* is very marked, and it shares the ant-like habit of the latter when seen running in life. It lacks, however, the essential characters of the subfamily Lamiinæ, viz.: the sulcate tibiæ and the slender palpi. The first character, it is true, is also lacking in the degenerate Methiini; but *Michthysoma* does not present an assemblage of feeble

characters that would permit it to be attached at the end of a group as a feebly differentiated cousin. The simple tibiæ, for though described by Dr. LeConte as "feebly sulcate," they are really not at all sulcate, place this insect in the subfamily Cerambycinæ, there to constitute a tribe related to Clytini. It may be noted that the affinity of this tribe through *Euderces* towards the Lamiinæ has already been stated, *vide* "Classification" p. 303.

The absence of the tibial sulci was pointed out by Dr. Horn several years ago, and I believe that he also stated then the true position of the tribe.

### Tribe I. Doroadiini.

This tribe, represented by numerous species in the neighborhood of the Mediterranean, has but two representatives in our fauna:

**Plectrura spinicauda** Mann., 1852, Bull. Mosc. ii, p. 366; Eschsch. Dej. Cat. 3 ed. p. 373: *producta* Lec., 1854, Proc. Ac. Phil. vii, p. 19; LeConte, U. S. Pacif. R. R. Ex. and Surveys xii, part ii, Entom. Report, 1857, p. 65, pl. 2, fig. 15; Coleop. Alaska (Tr. Am. Ent. Soc. xxi, 31).

Length 11-12 mm.; .44-.48 inch. *Habitat.*—Sitka, Queen Charlotte Island, Vancouver, Oregon, Washington.

**Ipochus fasciatus** Lec., 1852, Jour. Ac. Phil. ser. 2. ii, p. 167; *subnitidus* Casey, 1891, Ann. N. Y. Ac. Sci. vi, p. 45; *pubescens* Casey, l. c.

Length 7.5-4.5 mm.; .30-.18 inch. *Habitat.*—Southern California.

The first is a brownish insect with rows of shining tubercles on the elytra, which, at the apex, are prolonged into acute serrated cusps. The sides of the prothorax are armed and serrate. Mr. C. J. Weidt informs me that this species is frequently beaten from the crab apple.

The second is a robust convex insect, sparsely clothed with long erect hair; the thorax, which is unarmed, bears two pairs of discal pubescent spots; the elytra have three transverse, pubescent fasciæ, irregular in design and variable in extent, sometimes so broad as to cover the posterior part of the elytra. The males are more slender than the females. Gen. Casey states that this species occurs on the blossoming branches of pine. From the range of variation observed in a considerable number of specimens I am satisfied that the characters on which this author bases two new species are only individual.

### Tribe II. Monilemini.

Contains the genus *Monilema* only. Dr. Horn's synopsis (Trans. Am. Ent. Soc. xii, pp. 182–184) is as follows:

A. Scape of antennæ submucronate inwards at tip; first joint of hind tarsus as long, or even longer than the next two and comparatively slender. Subgenus **Monilema.**

B. Scape of antennæ simple; first joint of hind tarsus not longer than the next two and broad.....Subgenus **Collapteryx.**

### Subgenus **Monilema.**

In addition to the above-named characters the following may be mentioned: the first and second joints of the hind tarsi are glabrous at middle, the second with a narrow, spongy, pubescent space each side, the third entirely spongy pubescent. The anterior and middle tarsi have the first three joints spongy pubescent beneath, the pubescence divided by a narrow line.

The two species belonging here are separated as follows:

Thorax quadrate, or a little wider than long, the sides with a feeble tubercle; elytra sparsely and regularly punctured at basal half, wrinkled at apex, the sides arcuately deflexed.....**anunlatum.**

Thorax cylindrical, usually longer than wide, without trace of spine or tubercle; elytra not conspicuously punctate, usually smooth, but feebly shining, sometimes with deep longitudinal wrinkles, the sides abruptly deflexed and obtusely margined near the base.....**appressum.**

### Subgenus **Collapteryx.**

The vestiture of the tarsi is variable, and by it and other structures the species may be separated as follows:

Scape of antennæ and legs smooth.....2.

Three basal joints of antennæ and legs coarsely punctured.....7.

2. First joint of hind tarsus without any spongy pubescence beneath.....3.
   First joint of hind tarsus spongy pubescent over almost the entire surface..8.
3. Second joint of hind tarsus with a small spongy pubescent space each side..4.
   Second joint of hind tarsus without trace of spongy pubescence.....6.
4. Thoracic spines long and acute, directed strongly upward and backward.
   Elytra with slightly depressed disc, the sides abruptly declivous, obtusely margined near the humeri; thorax with very few punctures..**gigas.**
   Thoracic spines small or tuberculiform, sometimes barely perceptible.....5.
5. Thorax with numerous coarse and fine punctures intermixed over the entire surface, the coarser punctures more numerous near the base and apex. **semipunctatum.**
   Thorax almost entirely smooth, a few punctures at most, along the base and apex.
   Elytra with extremely few punctures, these placed at the middle of the sides and under the humeri.....**lævigatum.**
   Elytra with numerous coarse punctures extending two-thirds to apex, the deflexed portion punctured nearly to the apex.....**armatum.**
6. Anterior tarsi ♂ with the first three joints spongy pubescent beneath; thorax coarsely punctured with a feeble lateral tubercle.....**obtusum.**
   Anterior tarsi ♂ *with the first three joints spongy pubescent beneath;** ♀ with the third joint bearing a spongy pubescent space each side; thorax punctured at apex and base; the lateral spine small but acute. **spoliatum.**

* The words in italics are interpolated, and are necessitated by the discovery since the original was written of *spoliatum* ♂. The sexual marks in section 6 are also interpolated by me.—C. W. L.

Tarsi ♂ with scarcely a trace of spongy pubescence on any of the joints; thorax coarsely punctured, the lateral spine moderately long and acute. **forte.**

7. Thorax sparsely punctured, without trace of lateral tubercle; elytra coarsely punctured; hind tarsi with a small spongy pubescent spot at the apex of the first joint, the second and third joints entirely spongy pubescent ..... **subrugosum.**

8. Intercoxal process of mesosternum rather deeply grooved in its entire length; elytra variegated with a network of very fine pubescence in at least one sex.

Elytra distinctly wider at base than the thorax, the humeri slightly prominent; thorax with very few punctures, and these placed along the base and apex; pubescence of elytra white..... **ulkei.**

Elytra not wider at base than the thorax, the humeri rounded; thorax with numerous punctures on the disc; pubescence of elytra fulvous. **variolare.**

Intercoxal process of mesosternum nearly flat, not grooved; elytra not pubescent..... **crassum.**

The sexes of *Monilema* are distinguished by the form of the last ventral segment broadly emarginate in the male and oval at tip in the female. The femora are strongly clavate in the male, comparatively slender in the female. The pygidium is usually concealed in the male, exposed in the female.

I am indebted to Mr. Henry Ulke for a statement of the sex of his specimen of *M. obtusum*, of which species it is the type, and so far as I know the only representative.

## BIBLIOGRAPHY.

**M. annulatum** Say, 1824. Journ. Ac. Phil. p. 404; LeConte, ed. ii, 187; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 167; Lacord, Gen. Atl. x, pl. 97, fig. 2.

Length .48-.72 inch.; 12-18 mm. *Habitat.*—Arizona, New Mexico, Texas, Kansas, Missouri, Nebraska, Colorado, Montana.

**M. appressum** Lec., 1852, l. c. p. 168; Col. Kan. 1859, p. 21, pl. 2, fig. 17.

Length .56-1.16 inch.; 14-29 mm. *Habitat.*—Arizona, New Mexico.

**M. gigas** Lec., 1873, New Species, S. M. C. 264, p. 230; *spinicolle* Cas., 1891, l. c.

Length 1.20-1.36 inch.; 30-34 mm. *Habitat.*—Arizona, rare.

**M. semipunctatum** Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 167.

Length .74-1.00 inch.; 18.5-25 mm. *Habitat.*—Cape San Lucas, Lower California, rare.

**M. lævigatum** Bland, 1862, Proc. Ent. Soc. Phil. i, p. 267.

Length .84-.88 inch.; 21-22 mm. *Habitat.*—New Mexico, Kansas.

**M. armatum** Lec., 1853, Proc. Ac. Phil. vi, p. 234; Acan. Nat. 1859, p. 128, pl. 13, fig. 2.

Length .66-1.00 inch.; 16.5-25 mm. *Habitat.*—New Mexico, Texas, Colorado.

**M. obtusum** Lec., 1873, New Species, S. M. C. 264, p. 230.

Length .75 inch.; 19 mm. *Habitat.*—Utah, very rare. One specimen known.

**M. spoliatum** Horn, 1885, Trans. Am. Ent. Soc. xii, p. 186.
Length .75-1.00 inch. *Habitat.*—San Bernardino, California.

**M. forte** Lec., 1873, l. c. p. 230.
Length 1.20 inch.; 30 mm. *Habitat.*—Arizona, very rare. One specimen known.

**M. subrugosum** Bland, 1862, l. c.; Thoms. Physis, i, p. 75.
Length .78-1.08 inch.; 19.5-27 mm. *Habitat.*—Cape San Lucas, California.

**M. ulkei** Horn, 1885, l. c.
Length .76-.86 inch. *Habitat.*—New Mexico, Texas.

**M. variolare** Thoms., 1867, Physis, i, 1, p. 77.
Length .70-.88 inch.; 18-22 mm. *Habitat.*—Mexico (doubtfully U. S.).

**M. crassum** Lec., 1853, Proc. Ac. Phil. vi, p. 234; Lacord., Gen. Col. ix, 1869, p. 281, not. 2.
Length .74-.90 inch.: 18.5-22.5 mm. *Habitat.*—New Mexico, S. W. Texas.

In addition to the descriptions cited above, each species is redescribed by Dr. Horn, Trans. Am. Ent. Soc. xii, p. 186. All the species of *Monilema* live on cactus. The imagines are found on those plants, and Mr. W. G. Wright and other friends in the southwest tell me they have found the larvæ boring in them. The locality "Montana" for *M. annulatum* is taken from six specimens collected by Mr. L. Kennedy near Blatchford, in that State, where cacti are abundant. They exhibit considerable variation in sculpture, but are otherwise identical with the more southern form.

### Tribe III. Cyrtinini.

Contains a single representative occurring in the Atlantic States on dead branches of oaks. It is the smallest Lamiine in our fauna; dark piceous, the antennæ annulate, the elytra ornamented with a transverse blotch of white pubescence before the middle. The prothorax is smooth, oval, very convex; the elytra are also convex and each bears, near the scutellum, a large, acute spine. The legs are stout, the thighs strongly clavate, and the sulci of the anterior tibiæ are distinct.

**Cyrtinus pygmæus** Hald. (*Clytus*), 1847, Trans. Am. Phil. x, p. 42; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 166; *minutissimus* Dej., Cat. 3, ed. p. 357.
Length .08-.12 inch.; 2-3 mm. *Habitat.*—Alabama, District of Columbia, Pennsylvania, New Jersey, New York, Ohio, Massachusetts, Canada.

### Tribe IV. Psenocerini.

Contains a single representative occurring in the Atlantic States and westward to Nebraska on various forest trees and at times destructive to the cultivated currant. It is a dark brown or black insect, densely punctured, with the scutellum, a narrow oblique band composed of two spots about the middle, and a wider transverse

band behind the middle and not extending to the suture, clothed or composed of white pubescence. The elytra are cylindrical, and each bears an oval elevation near the scutellum, which is feeble, or may disappear in small specimens. This insect is abundant and varies greatly; the white markings of the elytra are often indistinct and even entirely absent. The name *tristis* has been applied to a small specimen lacking the elytral elevation and the bands, but, as pointed out by Dr. Hamilton, these characters indicate only individual variation.

**Psenocerus supernotatus** Say (*Clytus*), 1823, Journ. Ac. Phil. iii, p. 425; Lec., ed. ii, 200; Hald., 1847, Trans. Am. Phil. x, p. 42; Osten Sacken, Proc. Ent. Soc. Phil. i, p. 122; *lunifer* Dej. Cat. 3, ed. p. 375; *tristis* Casey, l. c.; Hamilton. 1892, Can. Ent. xxiv, 160 and 298.

Length .12-.24 inches; 3-5 mm. *Habitat.*—North Carolina. District of Columbia, Pennsylvania, New Jersey, New York, Massachusetts, Canada, Illinois, Iowa, Missouri, Nebraska, Kansas. [This species breeds in grape, currant and gooseberry of choice, and sometimes in twigs of apple, etc.] H.

### Tribe V. Monohammini.

Seven genera, constituting three groups, exist in our fauna:

Legs long, the front pair elongated in ♂, and the antennæ much longer than the body.
- Prothorax with lateral spines (*Monohammi*)..... **Monohammus.**
- Prothorax cylindrical (*Ptychodes*).
  - Scape of antennæ with a large, well-defined cicatrix.
    - Eyes nearly divided..... **Ptychodes.**
  - Scape of antennæ without cicatrix.
    - Elytra rounded at tip..... **Dorchaschema.**
    - Elytra pointed at tip..... **Hetoemis.**

Legs equal, not elongated (*Goes*).
- Scape of antennæ with a distinctly limited cicatrix.
  - Prothorax cylindrical..... **Cacoplia.**
  - Prothorax with a lateral spine..... **Goes.**
- Scape of antennæ with the cicatrix not sharply defined.
  - Prothorax with a strong lateral spine..... **Plectrodera.**

### MONOHAMMUS Serville

The following synopsis is copied from the work of Dr. Horn, Tr. Am. Ent. Soc. xii, p. 190:

Tips of elytra rounded, the sutural angle acute or spiniform, more especially in the male.
- General surface color brownish, the elytra irregularly mottled with patches of brown and gray or white pubescence..... **titillator.**
- General surface color piceous or black, more or less bronzed, elytral ornamentation as above, the surface sculpture coarser and deeper. **maculosus.**

Tips of elytra rounded, the sutural angle not prolonged, usually very obtuse.
Surface color black, distinctly bronzed, the elytra with very little or no patches of white and brown pubescence; antennæ annulate in the female. **scutellatus.**
Surface color brown, elytra sparsely mottled with small patches of gray and brown pubescence; antennæ of female uniformly pubescent. **confusor.**
Tips of elytra obliquely prolonged and acute: elytra brownish, surface feebly punctured, clothed with ochreous, white and brown patches intermixed. **marmorator.**

**M. titillator** Fab. (*Lamia*), 1775, Syst. Ent. p. 279: Oliv. (*Cerambyx*), 1795, Ent. iv, 67, p. 85, pl. 15, fig. 109; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 148; *Cerambyx carolinensis* Oliv., 1790, Enc. Meth. vii, p. 643; Ent. iv, 67, p. 85, pl. 12, fig. 88; (*Lamia*) *dentator* ♀ Fab., Syst. Ent. i, 2, p. 278; Beauv., Ins. p. 244, pl. 36, fig. 5; *minor* Lec., 1873, New Species, S. M. C. 264, p. 231.
Length 13-32 mm.; .50-1.25 inch. *Habitat.*—Canada to Washington and southward to Florida.

Varies greatly in size and length of male antennæ, which are sometimes four times the length of the body; also in the sculpture of the thorax and development of the sutural angle.

**M. maculosus** Hald., 1847, Trans. Am. Phil. x, p. 51; *mutator* Lec., 1850, Agass., L. Sup. p. 235; *marmoratus* ‡ Lec., Journ. Ac. Phil. 1852, ser. 2, ii, p. 148; *clamator* Lec., l. c. p. 149.
Length 16.5-27 mm.; .66-1.06 inch. *Habitat.*—Lake Superior, Montana, Idaho, Washington, California, Nevada, Arizona, New Mexico, Colorado, Vancouver, Ohio?

**M. scutellatus** Say, 1824 (*Cerambyx*), Long's Exp. ii, p. 289; Lec., ed. i, 192; Lec., l. c. p. 148; Mann., Bull. Mosc. 1853, iii, p. 248; *resutor* Kirby, 1837, Faun. Bor. Am. iv, p. 167; *oregonensis* Lec., 1873, New Species S. M. C. 264, p. 231: *obtusus* Casey, l. c.; Coleop. Alaska, Tr. Am. Ent. Soc. xxi, p. 31.
Length 16-31 mm.: .64-1.24 inch. *Habitat.*—Maine to Oregon and Hudson's Bay region, Arizona, Colorado, New Mexico, Alaska, British Columbia.

The scutellum is conspicuously clothed with white pubescence, the median line more or less denuded. The punctuation also is variable, and those specimens described by LeConte as *oregonensis*, and Casey as *obtusus*, in which the pubescence of the scutellum is amply divided by the median glabrous line, and that of the elytra more evidently arranged in small patches may indicate a race that is being differentiated in the Pacific States; at present the differences seem evanescent.

**M. confusor** Kirby, 1837, Faun. Bor. Am. iv, p. 168; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 148.
Length 28-31 mm.; 1.10-1.24 inch. *Habitat.*—Canada, New England and Middle States.

The male antennæ are often twice as long as the body.

**M. marmorator** Kirby, 1837, p. 169 (*Lamia*) *marmorata* Rand., 1838, Bost. Journ. ii, p. 42; *fautor* Lec., 1852, l. c. p. 149; *acutus* Lacord., 1869, Gen. Col. ix, p. 316. not.; *maculosus* Hald., Tr. Am. Phil. Soc. x, 51.

Length 25 mm.; 1.00 inch. *Habitat.*—Nova Scotia to Lake Superior.

This species is rare in collections.

All the species of *Monohammus* are redescribed by Dr. Horn in the Trans. Am. Ent. Soc. xii, pp. 191–192. They infest pine trees.

### PTYCHODES Serville.

**P. trilineatus** Linn., 1771 (*Cerambyx*); Mant., Plant. vi, p. 532; Drury, Ins. p. 91, pl. 41, fig. 1, ♀; Lec., 1852, l. c. p. 146; *Saperda vittata* Fab., 1777, Gen. Mant. p. 231; *Ptychodes vittatus* Hald., 1847, Trans. Am. Phil. x, p. 53.

Length 22–28 mm.; 88–1.12 inch. *Habitat.*—Louisiana.

A large brown insect; a broad white stripe on each elytral side margin and a common sutural stripe are all continued on the thorax. Heretofore known to our lists as *vittatus* Fab.; this insect, as noted by the late H. W. Bates (Biologia v, 95), must be called *trilineatus*, the Linnaean name having priority.

### DORCHASCHEMA LeConte.

The synopsis of Dr. Horn is as follows:

Thorax truly cylindrical, longer than wide; general surface color less the pubescence, brown.

Thorax transversely wrinkled, the punctuation indistinct; elytra densely cinereo-pubescent with small, rounded, denuded spot behind the middle. **wildii.**

Thorax not wrinkled, punctuation distinct; pubescence of elytra rather sparse, marmorate with ochreous spots, a denuded interrupted band behind the middle ..... **alternatum.**

Thorax slightly tubularly narrowed behind the middle, nearly as wide as long; color black; disc of thorax finely rugose ..... **nigrum.**

**D. wildii** Uhler, 1855, Proc. Ac. Phil. vii, p. 217.

Length 15–22 mm.; .60–.88 inch. *Habitat.*—Maryland, Pennsylvania, Ohio, Indiana.

**D. alternatum** Say, 1823 (*Saperda*), Journ. Ac. Phil. iii, p. 405; Lec., ed. ii, 188; Hald., 1847, Trans. Am. Phil. x, 54; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 147.

Length 8–12 mm.; .32–.48 inch. *Habitat.*—South Carolina, North Carolina, District of Columbia, Pennsylvania, New Jersey, New York, Ohio, Illinois, Texas.

**D. nigrum** Say, 1827 (*Saperda*), Journ. Ac. Phil. v, p. 272; Lec., ed ii, 330; Hald., l. c.; Lec., l. c.

Length 8–10 mm.: .32–.40 inch. *Habitat.*—Virginia, Pennsylvania, New Jersey, New York, Massachusetts, Canada West, Northern Illinois, Louisiana.

The first two species breed in mulberry and osage orange, the third in hickory, from the dead limbs of which it may be obtained in abundance.

### HETOEMIS Haldeman.

**H. cinerea** Oliv., 1795 (*Saperda*), Ent. 68, p. 28, pl. 3, fig. 35; Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 146; *juglandis* Hald., 1847, Trans. Am. Phil. x, p. 54; *Saperda trilineata* Say, 1823, Journ. Ac. Phil. v, 2, p. 273; Lec. ed. ii, 331.

Length 8-12 mm.; .32-.48 inch. *Habitat.*—Alabama, Pennsylvania, New Jersey, New York, Ohio, Northern Illinois, Louisiana.

Breeds in walnut, mulberry, osage orange and hickory, and may be obtained from dead limbs of the latter abundantly. Similar in appearance to the preceding species, but uniformly clothed with gray pubescence. The antennæ are very long and slender, and the elytra are pointed towards the tip.

### CACOPLIA LeConte.

**C. pullata** Hald., 1847 (*Saperda*), Trans. Am. Phil. Soc. x, p. 55; *Saperda* Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 163: Proc. Ac. Phil. vi, p. 234; *pruinosa* Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 149. Proc. Acad. Nat. Sci. vi, 234; *Hebestola nebulosa* Hald., l. c. p. 54.

Length 10-16 mm.; .40-.64 inch. *Habitat.*—Alabama, Pennsylvania, New Jersey, New York.

Uniformly clothed with soft gray pubescence; thorax unarmed, elytra simply rounded at tip or obsoletely truncate; frontal line impressed, a longitudinal glabrous line at middle of pronotum. This species is taken frequently by Mr. Wenzel, near Philadelphia, on swamp oak, but seems otherwise to be seldom found.

### GOES LeConte.

Dr. Horn's synopsis (Tr. Am. Ent. Soc. xii, p. 193) is as follows:

Surface color of the body brownish; antennæ of male at most one and a quarter times the length of the body.....2.

Surface color of body black, shining; antennæ of male twice as long as the body, of females as long as in the preceding males.....5.

2. Elytra with conspicuous denuded fascia one-third from apex.....3.
   Elytra without conspicuous denuded fascia.....4.
3. Pubescence of surface white.....**tigrina.**
   Pubescence ochreous or luteous, the basal region of elytra darker, less pubescent.....**pulchra.**
   Pubescence marmorate, whitish and ochreous, the apical region darker ochreous.....**debilis.**
4. Pubescence luteous or pale brown, inconspicuously mottled with paler spots. **tesselata.**
   Pubescence cinereous or almost white, uniform, sometimes with a faint trace of darker fascia.....**pulverulenta.**
5. Elytra coarsely punctured; pubescence whitish, a small conspicuous black spot on each elytron one-third from apex.....**oculata.**

**G. tigrina** De Geer, 1775 (*Cerambyx*), Ins. v. p. 113, pl. 14, fig. 6; Lec., 1852. ser. 2, ii, p. 150; *Monohammus tomentosus* Ziegler, Proc. Acad. ii, p. 47; Hald., l. c. p. 51; *tigris* Schoenh., Syn. Ins. i, 3, p. 383.

Length 25 mm.; 1.00 inch. *Habitat.*—Florida, Maryland, Pennsylvania, New Jersey, New York, Canada West.

**G. pulchra** Hald., 1847 (*Monohammus*), l. c. p. 150.

Length 23 mm.; .92 inch. *Habitat.*—South Carolina, North Carolina, Pennsylvania, New Jersey, New York, Vermont, Ohio, Louisiana. Breeds in hickory.

**G. debilis** Lec., 1852, l. c. p. 150.

Length 11-13 mm.; .44-.52 inch. *Habitat.*—Pennsylvania, New Jersey, New York, Iowa, Louisiana.

**G. tesselata** Hald., 1847 (*Monohammus*), l. c. p. 51; Lec., l. c. p. 150.

Length 20 mm.; .80 inch. *Habitat.*—Georgia, N. Jersey, New York, Louisiana.

**G. pulverulenta** Hald., 1847 (*Monohammus*), l. c. p. 51; Lec., l. c. p. 150.

Length 20-22 mm.; .89-.88 inch. *Habitat.*—Florida, Pennsylvania, New Jersey, New York, Massachusetts, Ohio. Breeds in beech and in wild cherry.

**G. oculata** Lec., 1862, Proc. Acad. p. 40.

Length 10-11 mm.: .40-.44 inch. *Habitat.*—Pennsylvania, New York, Canada West, Ohio, Wisconsin.

## PLECTRODERA LeConte.

**P. scalator** Fab., 1775 (*Lamia*), Ent. Syst. i, 2, p. 278; (*Cerambyx*) Oliv., 1795, Ent. iv, 67, pl. 22, fig. 172: Lec., 1852, Journ. Ac. Phil. ser. 2, ii, p. 151; *Lamia belli* Lec., Bost. Journ. v. p. 209; *scalator* Lec., l. c. pl. 18, fig. 11.

Length 25-35 mm.; 1.00-1.40 inch. *Habitat.*—Texas, Louisiana, Kansas, Missouri, Nebraska, Illinois, Montana, Western Pennsylvania, District of Columbia.

Black, shining, with conspicuous white pubescence arranged in irregular transverse fasciæ. The Montana specimens bear much more pubescence than those living in the Mississippi Valley.

[Breeds in various poplars (*Populus*), which are sometimes greatly injured by the larvæ.] "Ham."

### Tribe VI. Mesosini.

Contains one species.

**Synaphœta guexi** Lec., 1852 (*Mesosa*), Journ. Ac. Phil. ser. 2, ii, p. 166; U. S. Pacif. R. R. Surv. vol. xii, part ii, Zool. Ent. Rept. 1857 (*separatum*), p. 66, pl. 2, fig. 16; Thoms., Syst. Ceram. p. 60.

Length 12-19 mm.: .48-.76 inch. *Habitat.*—California, Vancouver.

A large stout insect with gray pubescence; antennæ annulate, prothorax with two black vittæ and elytra each with two angulated black bands.

### Tribe VII. Acanthoderini.

This tribe, which contains a considerable number of species, has been reviewed by Dr. Horn in the TRANSACTIONS viii, pp. 115–133. The synopsis which follow are founded upon his, but in some instances the accumulation of specimens indicates that the number of species may be reduced.

The arrangement of the genera is as follows:

Scape of antennæ clavate.....Subtribe **Acanthoderini.**
Scape of antennæ nearly cylindrical.....Subtribe **Acanthocinini.**

#### Subtribe Acanthoderini.

All the species are referred to *Acanthoderes.*

#### Subtribe Acanthocinini.

Lateral tubercle of thorax at the middle, tarsi broad.....(**Lagochierini**).
Lateral spine of thorax very prominent, the disc tuberculate, antennæ much longer than the body.....**Lagocheirus.**
Lateral spine obtuse, disc not tuberculate, antennæ not longer than the body in either sex.....**Cœnopœus.**
Lateral tubercle of thorax behind the middle; tarsi slender, except in *Mecotetartus.*
Females without elongated ovipositor.....(*Liopi*).
Thorax feebly tuberculate or angulate at the sides a little behind the middle, mesosternum broad, first joint of hind tarsi not longer, if as long, as the next two.....**Leptostylus.**
Thorax distinctly angulate, usually acutely tuberculate, or with a short spine behind the middle; mesosternum triangular or narrow.
Antennæ without traces of ciliæ beneath, first joint of hind tarsi as long as the next two.
Prosternum narrow, but not linear: body without erect hairs.**Liopus.**
Prosternum linear, form cylindrical, elytra with erect hairs..**Dectes.**
Antennæ distinctly ciliate beneath.
Hind tarsi short, first joint not as long as 2-3; antennæ of ♂ very long, the fourth joint longer than the whole body....**Mecotetartus.**
Hind tarsi slender, first joint as long as the next three; antennæ normal; pro- and mesosternum very narrow.
Elytra without lateral carina.....**Lepturges.**
Elytra with distinct lateral carina.....**Hyperplatys.**
Females with elongated ovipositor.....(**Acanthocini**).
Body above with erect hairs besides the pubescence.
Mesosternum broad; antennæ not much longer than the body and not ciliate beneath, except feebly on the scape.....**Graphisurus.**
Mesosternum narrow: antennæ twice as long as the body and very slender, ciliate beneath .....**Ceratographis.**
Body above without erect hairs.
Mesosternum moderate; antennæ very long, joints 3-4, at least, densely fringed beneath with short hairs.....**Acanthocinus.**
Mesosternum broad; antennæ moderate, not fringed beneath, lateral tubercle of thorax close to the base, ovipositor of the female shorter than usual .....**Nyssodrys.**

The arrangement of the genera as stated above is that of the "Classification," and incorporates the recent notes of Dr. Horn and Messrs. Bates and Gahan.

**ACANTHODERES** Serville.

Body above maculate with white pubescence.
Sutural region of elytra vaguely grooved, the groove limited on each elytron by a feeble costa.
Elytra with moderately broad transverse band of white in front of middle broadly interrupted at the suture.....**quadrigibbus.**
Sutural region not grooved.
Elytra with moderately broad oblique space of whitish pubescence extending from the humeri to the suture.....**peninsularis.**
Elytra without whitish space, but with a distinct M-shaped black mark behind the middle on each.
Base of elytra irregular, an oblong obtuse umbone at middle of base. Smaller species.....**decipiens.**
Base of elytra regularly convex, without umbone. Larger species. **morrisii.**
Body above not maculate, elytra with black setæ.....**wickhami.**

**A. quadrigibbus** Say, 1835 (*Acanthocinus*), Bost. Journ. i, 195; Lec., ed. ii, 665; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 175; *bimaculatus* Mels., Cat. No. 758.
Length 10 mm.; .40 inch. *Habitat.*—Massachusetts, New York, New Jersey, Pennsylvania, Ohio, North Carolina, Louisiana, Arizona.

**A. peninsularis** Horn, Tr. Am. Ent. Soc. 1880, viii, 116.
Length 12-16 mm.: .48-.64 inch. *Habitat.*—Lower California.

**A. decipiens** Hald., 1847 (*Aegomorphus*), Tr. Am. Phil. Soc. x, 45; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 176.
Length 12 mm.: .48 inch. *Habitat.*—Massachusetts, New York, New Jersey, Pennsylvania, Virginia, Georgia, Louisiana, Nebraska, Ohio, Canada, Maine.

**A. morrisii** Uhler, 1855, Proc. Ac. vii, p. 417; *leucogenus* Thoms., 1868, Physis, i, 6, p. 148.
Length 20 mm.; .80 inch. *Habitat.*—Missouri, Pennsylvania, Canada.

**A. wickhami** n. sp.
Length 10-12 mm.; .40-.48 inch. *Habitat.*—Southern Arizona.

Several specimens taken under the leaves of *Opuntia* (Cactus) in the Tucson Mountains by Mr. H. F. Wickham, to whom I take much pleasure in dedicating this species.

Form moderately robust, above slightly depressed, color nearly black, body and elytra sparingly clothed with short black hair. Head closely punctulate, a few coarse punctures intermingled, pubescence very sparse. Eyes coarsely granulate, emarginate in front; antennæ brownish piceous, as long as the body ♂, the scape clavate, second joint short, third slightly longer than fourth, 4-11 gradually longer; each joint beyond the second finely pubescent and bearing at apex three or

four stiff hairs. Thorax wider than long, strongly angulate at middle of sides, disc vaguely bituberculate before the middle, surface finely punctulate and clothed with distantly placed black hairs. Elytra nearly parallel, wider at base than the thorax at middle, slightly convex; finely punctulate with numerous large punctures intermixed, from which proceed short, stiff, black hairs; sutural stria obsolete at base, well marked at apex, dorsal striæ obsolete; a vaguely marked oblique depression starts at each humerus and disappears before it reaches the suture. Elytral apices conjointly rounded, slightly dehiscent. Body beneath piceous, punctulate, sparsely pubescent. Legs brownish, finely pubescent with long, fine, brown hairs intermixed. Femora clavate; tibiæ straight; tarsi broad, densely pubescent beneath, without fringe of long hair at the sides.

In respect to the form of the tarsi, this species is not congeneric with our other *Acanthoderes*, but it otherwise falls within the limits of that genus, and is readily distinguished by its uniform dark color. A specimen in Dr. Horn's collection was examined by the late H. W. Bates, and by him thought to be allied to *Tapeina*.

### LAGOCHEIRUS Erichson.

This genus contains two species occasionally found in the extreme south of our country, large robust insects, brown, marked with gray pubescence. They may be separated by Dr. Horn's synopsis:

Punctures of elytra barely attaining the middle, humeral region submuricate, disc with very evident rows of short, erect scale-like hairs. **araneiformis.**

Punctures extending to apical fourth, humeral region simply punctured, disc with feeble traces of tufts..... **obsoletus.**

**L. araneiformis** Linn., 1767 (*Cerambyx*), Syst. Nat. ed. xii, p. 625; Drury, Ins. p. 66, pl. 35, fig. 4 (*Acanthoderus*); Castle, In. Hist. Nat. ii, p. 462; Thoms., Class. Long. pl. 1, figs. 1-8; Jacq., Duv. Hist. Cub. vii, p. 271, pl. 11, fig. 2; Chev., An. France, 1862, ser. 4, vol. ii, 247.

Length 19-23 mm.; .76-.92 inch. *Habitat.*—Florida, Mexico, Brazil, Tahiti, San Domingo, Cayenne.

**L. obsoletus** Thoms., 1860, Class. Long. p. 10.

Length 22.5-24 mm.: .90-.96 inch. *Habitat.*—Mexico, Lower California.

### CŒNOPŒUS Horn.

**C. palmeri** Lec., 1873 (*Leptostylus*), New Species, S. M. C. No. 264, p. 233; Horn, 1880, Trans. Am. Ent. Soc. viii, p. 118, pl. 2, fig. 1.

Length 18 mm. ♀, 25 mm. ♂; .70-1.00 inch. *Habitat.*—Arizona, So. California.

Antennæ black, each joint annulate with cinereous at base. Thorax sparsely coarsely punctured, surface irregularly clothed with very fine ochreous pubescence. Elytra about twice as long as wide at base, punctures moderately coarse, distant and irregular, surface without costæ or tubercles, piceous black, with a large discal saddle shaped space of ochreous pubescence extending a little behind the middle, behind which are large irregular spots of similar pubescence. Body beneath with extremely fine ochreous pubescence. Legs black, with very fine black pubescence, tibiæ with a cinereous band at middle.

The pattern of the elytral markings in the present genus and in *Lagocheirus* are the same, and in both genera the sixth joint of the antennæ is prolonged inwards in the male sex.

**LEPTOSTYLUS** LeConte.

The species which comprise this genus resemble very closely those of the following genus, but may be known by the form of the lateral tubercle of the thorax, which is, in every species, very obtuse.

Elytra with asperities or tubercles bearing at their summits short, black, scale-like hairs.....A.
Elytra without asperities and scale-like hairs.....B.
B. Prosternum as wide between the coxæ as the width of a coxal cavity; elytra slightly truncate at tip.....**macula.**
Prosternum narrower than a coxal cavity; tips of elytra separately rounded.
Thorax sparsely punctured, the flanks at middle without punctures. **perplexus.**
Thorax moderately densely punctured, the flanks as densely punctured as the disc.....**collaris.**
A. Thorax densely punctured; elytra with densely placed, coarse, deep punctures.....**sexguttatus.**
Thorax not densely punctured; elytral punctures not closely placed, often inconspicuous or concealed.
Legs hairy, antennæ slightly pilose beneath.....**albidus.**
Legs not hairy, antennæ not pilose.
Surface of thorax not tuberculate, even, punctures regularly placed.
Elytra very indistinctly punctured, especially at apex, the disc with angulate fascia behind the middle, the apices feebly obliquely truncate.....**biustus.**
Elytra distinctly punctured over the entire surface, disc with acutely angulated fascia, apices slightly prolonged not obliquely truncate. **parvus.**
Elytra more distinctly punctured near the apex than at base, apices very obliquely truncate, disc with arcuate fascia at the declivity **arcuatus.**
Surface of thorax more or less tuberculate, and with the punctures irregularly placed and rugose.
Elytra feebly or not roughened with acute tubercles, antennæ in both sexes longer than the body, the joints three and four together not longer than 5-7 taken together.
Tips of elytra not prolonged, apices separately rounded; thorax with rather strong discal tubercle.....**nebulosus.**
Tips of elytra obliquely prolonged, apices obliquely truncate, thorax with very flat tubercles.
Elytra without rows of tubercles, a few only near the base, post-humeral oblique impression very feeble; hind trochanters of ♂ slightly prolonged.....**planidorsus.**
Elytra with four distinct discal series of obtuse tubercles, post-humeral oblique impression well marked; hind trochanters of ♂ not prolonged.

Thorax irregular, but without denuded spaces or lines.
**terræcolor.**

Thorax with median, fine carina denuded at apex, a short oblique line on each side at apical margin, often denuded.
**argentatus.**

Elytra with asperities well marked, either as acute tubercles or ridges; antennæ scarcely longer than the body, even in the male; joints three and four together equal in length to 5-8 taken together.

Hind trochanters of ♂ prolonged into a short, but acute spine.
**aculifer.**

**L. aculifer** Say, 1823 (*Lamia*), Jour. Am. Phil. Soc. iii, 329; Lec., ed. ii, 186; *Amniscus aculifera* Hald., Tr. Am. Phil. Soc. x, 47: *A. albescens* Hald., l. c. 46; *A. marginellus* Hald., l. c. 47; *A. asperatus* Hald., l. c. 46; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 168; *tuberculatus* Frölich, Naturf. 29, 1832, p. 123, pl. 3, fig. 13; Uhler, Patent Office Rep. 1860, p. 319.

Length 7.5–10 mm.; .40 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, West Virginia, District of Columbia, Virginia, Florida, Texas, Arkansas, Missouri, Kansas, Nebraska, Wisconsin, Illinois.

[A robust, easily recognized species, surface blackish brown, with prostrate cinereous pubescence, a whitish band behind the middle, broad at the suture, but narrowing to a point toward the sides, behind which the surface is conspicuously fuscous. Frequently the basal two-thirds of the elytra is clothed with grayish white pubescence with a marginal streak fuscous from denudation; the asperities mentioned in the table are black and conspicuous. The color and markings are very variable as indicated by the synonymy.

Breeds in a variety of trees either diseased or recently cut, seldom in old timber; the larvæ mine under the bark, as do those of many of its congeners; I have found it in oak, apple, sycamore (*Platanus*), which is its natural food-plant (Uhler). Riley, on osage orange.] "Ham."

**L. argentatus** Duval, 1857, Ramond de Sagra, Hist. Cuba, vii, p. 273; Chevrolat, An. France, 1862, ser. 4, vol. ii, p. 247; *Amniscus* Dej., Cat.; Lec. (the genus), Jour. Acad. Nat. Sci. ser. 2, ii, 168; Horn, Tr. viii, 120.

Length 9.5 mm.; .38–.44 inch. *Habitat.*—Southern Florida, Nassau, N. P., Cuba.

[Form more elongate, more convex and with longer antennæ than in *aculifer;* there are no denuded asperities, and the hind trochanter of the male is not spiniform; clothed with silvery white pubescence, a slight cloud at the sides of the elytra, a short dark fascia at the declivity, four rows of feebly elevated pubescent tubercles on each, the apices emarginately truncate with the outer angle acute; the thorax is uneven with several tuberculoid elevations, uniformly pu-

bescent, the denuded lines mentioned in the table may either be present or absent; the scutellum is frequently bordered with black from denudation; the antennæ and feet are annulated with brown.] "Ham."

**L. terræcolor** Horn, 1880, Tr. Am. Ent. Soc. viii, 122; *transversatus* ‡ Lec., Lec., Proc. Am. Phil. Soc. xvii, 414.

Length 9-12 mm.; .36-.48 inch. *Habitat.*—Florida (Bay Biscayne, Lake Worth).

[Elongate, broad, luteous brown, densely clothed with luteous pubescence, a faint darkish cloud and a narrow arcuate fascia behind middle, sometimes obsolete; thorax short, median tubercle indicated by a cluster of coarse punctures, a row of coarse punctures across base and apex; each elytron with four rows of small pubescent tubercles more or less obsolete; the antennæ are annulate and spotted on the upper side.

Breeds in the bark of stumps and logs of recently cut mastich (*Sideroxylon pallidum*), also in the rubber or banian (*Ficus pedunculatus*)] "Ham."

**L. planidorsus** Lec., 1873, New Species, Ceramb. (S. M. C. No. 264), p. 234.

Length 9 mm.; .36 inch. *Habitat.*—Florida, Louisiana, Texas, Michigan.

[More convex than any of the preceding, densely clothed with fine gray pubescence, often silvery white in southern examples, a blotch along the sides of the elytra (sometimes obsolete) and an oblique, interrupted fascia on the declivity, dark; thorax with a small, denuded tubercle on middle of disc, and three or four smaller ones anteriorly, sometimes scarcely evident; elytra with a slightly flattened area at base limited by a more or less evident carina. The oblique fascia is sometimes complete and conspicuous, and the area behind it fuscous; the posterior trochanters in the male are acute and slightly prolonged; varies in appearance.] "Ham."

**L. nebulosus** Horn, 1880, Tr. Am. Ent. Soc. viii, 122.

Length 12.5 mm.; 50 inch. *Habitat.* Nevada.

[Rather convex, clothed with dark gray pubescence, an indistinct angulate band of paler pubescence at middle of elytra and a dark spot on each side; the thorax is one and one-fourth wider than long, while in all the other species it is from one and one-half to twice wider.] "Ham."

**L. arcuatus** Lec., 1878, Proc. Am. Phil. Soc. xvii, 414.

Length 8 mm.; .32 inch. *Habitat.*—Florida (Tampa).

[This species may easily be recognized by the silvery gray hair on the anterior two-thirds of the elytra, while the posterior third is

smoky brown, and separated by a tri-arcuate line concave in front and joining on each side a narrow black line dilated behind the humerus; the first joint of the hind tarsi is as long as the next two. The latter character if considered apart from others would place this species in *Liopus*, but its general facies and the form of the tubercle at the side of the thorax place it more naturally here.] "Ham."

**L. parvus** Lec., 1873, New Spec. Ceramb. (S. M. C. No. 264), p. 234; Horn, Tr. Am. Ent. Soc. viii, 121.

Length 4 6 mm.; .16-.24 mm. *Habitat.*—Canada, Pennsylvania, District of Columbia, Ohio, Kansas, Texas.

[Brownish testaceous, pubescence very fine, dense, dark cinereous; an acutely angulate, oblique white band on the elytra behind the middle; four or five minute flat facets on the disc of the thorax, each punctured, often obsolete; in well-marked examples there is on each elytron four costulæ each with a row of small tubercles bearing short erect scales, these in other examples are more or less obsolete. In western Pennsylvania examples the thorax is very dark, the elytra pale olivaceous, with the scale-bearing points conspicuous and the angulated band feebly visible or wanting; not common.] "Ham."

**L. biustus** Lec., 1852, Jour. Acad. Nat. Sci. ser. 2, ii, 169; Klug., Dej. Cat. 3d ed. p. 364; Chevrolat, *Exocentrus biustus*, An. France, 1862, ser. 4, ii, 249.

Length 4-6 mm.; .16-.24 inch. *Habitat.*—Canada, New York, New Jersey, Virginia, Florida, Cuba, Louisiana, Texas, Illinois.

[Elongate, narrow, brownish testaceous, pubescence silvery gray, the sides of thorax beneath and of the elytra to middle, black; a large triangular area posteriorly conspicuously brown; tarsi black. Readily known by the table and the above characters.] "Ham."

**L. albidus** Lec., 1852, Jour. Acad. Nat. Sci. ser. 2, ii, 168.

Length 8.5 mm.: .34 inch. *Habitat.*—Arizona.

[This species, from the description, resembles *biustus*, but readily distinguished by the erect, white hairs scattered over the surface; it is densely clothed with white pubescence vaguely variegated with fulvous, the sides of the elytra and a large apical area infuscate.] "Ham."

**L. sexguttatus** Say, 1825 (*Lamia*), Jour. Acad. Nat. Sci. v, 269; Lec., ed. ii, 328; *Amniscus commixtus* Hald., 1847, Tr. Am. Phil. Soc. x, 47; *hebes* Dej., Cat. 3d ed. 36; *punctatus* Hald., l. c. 49; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 169; Fitch, Rep. iv, 26 (sep.).

Length 7-10 mm.; .28-.40 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, Pennsylvania, District of Columbia, Ohio, Michigan, Wisconsin, New Mexico.

[Variable in color and elytral ornamentation. The thorax is somewhat aciculately punctured, disc with five small tuberculoid spots more or less obsolete, pubescence dark, a little variegated with gray; elytra closely, but coarsely punctured, each with two or three faintly elevated costæ, which with the suture each bear a row of distantly placed black points, indefinitely mottled with pale gray and dark spots, an elongate dark spot behind base, another behind middle sometimes becoming a fascia, and another near apex; sides dark with a gray spot near base, and a smaller one near middle; the antennæ and feet are annulated.

All the above markings are more or less obsolete in a large proportion of the individuals. A variety from New Mexico has the body dull rufous and without the rows of penicillate points on the elytra. Said to breed in pine.] "Ham."

**L. collaris** Hald., 1847 (*Amniscus*), Tr. Am. Phil. Soc. x, 46; *interruptus* Hald., l. c. p. 48; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 170.

Length 10 mm.; .40 inch. *Habitat.*—New York, New Jersey, Pennsylvania, Maryland, Georgia, Florida, Alabama, Kentucky.

[Dull luteous, elytral surface uneven, sprinkled with minute black spots and irregular patches of dark and gray. In typical examples a brownish irregular band extends from humerus to middle, thence narrowing to suture, behind which near the suture are one or two black spots, but in other examples the bands and spots are wanting; the basal angles are black and polished. Thorax with three conspicuous basal tubercles on disc and three smaller ones (sometimes obsolete) near apex.

Var. *interruptus* has red-brown bicostate elytra, with an obsolescent cinereus spot at base, another at the outer margin behind the middle, a third behind this near the suture, and a fourth before apex at the junction of the costæ.] "Ham."

**L. perplexus** Hald., 1847 (*Amniscus*), Tr. Am. Phil. Soc. x, 46; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 169.

Length 12.5 mm.; .50 inch. *Habitat.*—Georgia, Florida.

[Testaceous, pubescence cinereous mottled with brown, sides of elytra in front and an oblique streak on the declivity darker; the disc of the thorax with five tubercles, the anterior two of which are best developed, the others sometimes obsolete; elytra coarsely punctured.] "Ham."

**L. maculata** Say, 1826 (*Lamia*), Jour. Acad. Nat. Sci. v, 269; Lec., ed. ii, 327; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 169; *Amniscus sticticus* Hald., Tr. Am. Phil. Soc. x, 48.

Length 4-9 mm.; .16-.36 inch. *Habitat.*—Canada, Maine, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, West Virginia, District of Columbia, Virginia, Michigan, Lake Superior, Wisconsin.

[Form convex, short, robust, brownish, sparsely pubescent, the sides of the thorax broadly, a broad fascia on the declivity of the elytra mostly interrupted by the suture and behind this a blotch on each, white pubescent; a broad brown streak down the middle of thorax bounded on each side by a line of two or three denuded tubercles; a larger tubercle near middle of disc. I have bred this species in great abundance from dead hickory limbs; also from black and from white walnut. It is likewise recorded as bred from beech and chestnut.] "Ham."

## LIOPUS Serville.

The following synopsis is based on that of Dr. Horn, Tr. Am. Ent. Soc. viii, 124:

Front flat, mouth in the same plane as the front; antennal joints 6-10 equal; elytra without angular mark posteriorly; sides of thorax arcuate, the spine small and acute; elytra without erect scales.. **variegatus.**

Front convex, mouth slightly retracted; antennal joints 6-10 equal; lateral spine of thorax at a distance from the base.

Elytra with distinct tufts of small, black, erect scales.

Sides of thorax in front of spine arcuate, the spine small, acute and abruptly formed..... **wiltii.**

Sides of thorax oblique from the anterior angles to the tip of the lateral spine.

Form robust; pubescence pale cinereous.

Elytra with one broadly angulated band (resembles *Leptostylus biustus*). **crassulus.**

Elytra with two angulate bands..... **minuens.**

Elytra with a common rounded sutural spot behind the middle black. **centralis.**

Form slender, pubescence brown, elytra with one band forming a broad angle and with second band less distinct posteriorly. **fascicularis.**

Elytra without tufts of erect scales.

Tibiæ without long flying hairs.

Elytra with a conspicuous arcuate band behind middle..... **schwarzi.**

Elytra with an acutely angular band behind the middle, sometimes wanting..... **alpha.**

Elytra without angular band, a feebly marked transverse band of whitish pubescence..... **punctatus.**

Elytra with a transverse undulate fascia behind middle. **foveatocollis.**

Tibiæ with long flying hairs, especially the posterior..... **setipes.**

**Liopus variegatus** Hald., 1847 (*Amniscus*), Tr. Am. Phil. Soc. x, 47; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 172; var. *trifasciatus* Hald., l. c.; var. *obscurus* Hald., l. c.

Length 6-12 mm.: .24-.48 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, West Virginia, District of Columbia, Virginia, Alabama, Louisiana, Texas, Kansas, Illinois, Indiana, Michigan.

[Form moderately robust, a little elongate, surface reddish or yellowish brown; elytra variegated with small yellowish, dark and cinereous points and blotches, on the disc two costæ which unite near apex, and are crossed behind middle by a dark blotch behind which is a patch of gray pubescence.

Var. *trifasciatus* has on the elytra three irregular dark brown fasciæ.

Var. *obscurus* is very dark brown, with three indistinct black fasciæ; beneath blackish brown.

Breeds under bark of *Negundo aceroides* (Chittenden).] "Ham."

**L. wiltii** Horn, 1880, Tr. Am. Ent. Soc. viii, 124.

Length 9 mm.; .36 inch. *Habitat.*—Texas.

[Form as in *variegatus*, but more convex; the pubescence is gray maculated with small dark spots both on thorax and elytra; elytra with a broad band behind the base not reaching the suture, an angular oblique band at apical third and behind this another interrupted nearly transverse one, black; each with three subcostæ, not always evident, on which are black tuberculiform spots, and external to these two other rows. This species appears to be very uniform in all characters.] "Ham."

**L. crassulus** Lec., 1873, New Spec. Ceramb. (S. M. C. No. 264) p. 235; Horn, Tr. Am. Ent. Soc. viii, 125; *mimeticus* Casey, An. N. Y. Acad. Sci. 1891, vi. 48; Proc. Cal. Acad. Sci. ser. iv, 339.

Length 6-6.5 mm.; .24-.26 mm. *Habitat.*—Lower California, Cape San Lucas, Texas, District of Columbia, New Jersey.

[Robust, convex, surface when denuded piceous, sometimes paler, clothed with short cinereous pubescence. Head minutely densely punctulate; antennæ one-half longer than the body, annulate with black at the incisures and spotted above, scape and joints 3-4 subequal, joints beyond the fourth pale tinged with rufous. Thorax transverse, nearly twice as wide as long, and nearly as wide as the elytra, pubescence nearly uniform, convex, scarcely punctulate, spiniform tubercle in advance of basal third; scutellum rounded behind, narrowly bordered with black. Elytra slightly obliquely impressed each side of scutellum, moderately coarsely punctured, punctures gradually obsolescent toward apex, which is slightly obliquely truncate; the suture, three slightly elevated lines, the humeral line and margin each bearing a row of sparsely placed setigerous black points; pubescence cinereous, variegated with denudations; humeral angles black, polished; a large denuded blotch on each side in front of middle, behind middle with the

convexity anterior a deep, arcuate, denuded black band attaining the middle of each elytron, external to which is a short transverse band, underside with fine dense, uniform pubescence. Legs spotted, femora clavate, distal end luteous, tarsi and apex of tibiæ black. Similar to *Leptostylus biustus*.

This species is variable, frequently the raised lines on the elytra are wanting, and scarcely any of the black points present; the arcuate band may exist merely in a trace. The type was an imperfect example from Lower California, but others have since been taken there. Breeds in the dead twigs of *Celtis texana* (Schwarz .] "Ham."

[**L. minuens** n. sp. *Habitat.*—Florida (Lake Worth, Biscayne Bay).

Form robust, slightly elongate, slightly depressed, pubescence cinereous, exceedingly fine, short and inconspicuous. Head finely punctate, indented between the antennæ, front convex. antennæ (female) a little longer than the body, (male) one-half longer, joints beyond the fourth subequal, third a little longer than the fourth, annulate at the incisures and spotted with black on the upperside. Thorax one-half wider than long, sides oblique to front from the summit of the lateral tubercle, which is near the base and sometimes spinose, sometimes not; disc minutely punctate, a broad fuscous stripe down the middle, in which are four minute denuded black points not always visible; scutellum fuscous, rounded; elytra with a flattened area behind the scutellum, on each side four lines of distant penicillate black points, one of which is on the suture and two on vaguely elevated lines, in front of the declivity a narrow angulated dark line sometimes scarcely evident, behind which is an oblique band not attaining suture nor margin, a fuscous stripe on the disc in front of the angulated line is sometimes present, tips narrowly truncate, punctuation not coarse nor close. Legs spotted with fuscous, tarsi black; femora short, strongly clavate. Length 3.5–4.5 mm.; .14–.18 inch.

Taken abundantly at Lake Worth, Florida, on the dead vines of *Melothria pendula*, but it probably breeds like its congeners in the limbs of trees, Bay Biscayne (Schwarz). In an example from Mr. Schwarz, taken at Lake Worth, there is on the elytra a broad, black, denuded sutural stripe from base to apical third, probably only an individual variation.] "Ham."

**L. centralis** Lec., 1884, Trans. Am. Ent. Soc. xii, 24.

Length 6.5 mm.; .26 inch. *Habitat.*—Arizona.

[Form stout, as in *crassulus*, pubescence pale gray mottled with dark spots; on the elytra are small tufts of black scales, a small spot behind middle, a lateral one in front of middle and two clouds behind the middle, dark.] "Ham."

**L. fascicularis** Harris, 1836 (*Mesosa*), Tr. Hartf. Soc. Nat. Hist. i, p. 68, pl., fig. 9; *xanthoxyli* Shimer, 1867, Tr. Am. Ent. Soc. ii, 7; Packard, Forest Insects, p. 659 (Bul. 7, 5th Rep. U. S. Ent. Commis.).

Length 5–6 mm.; .20–.24 inch. *Habitat.*—Wisconsin, Michigan, Illinois, Ohio, New York, New Jersey, Florida.

[Without close inspection this species may readily be mistaken for some of the forms of *alpha;* the elytra are moderately coarsely and rather closely punctured to apex, on each are three slightly elevated lines the inner and outer of which unite before the apex; on these and also along the suture are sparsely placed, minute tufts of erect black scales, the two bands on the elytra while not arcuate, are very widely angulate. These characters are taken from the form *xanthoxyli.* Breeds in the wood of dead prickly ash (Shimer.] "Ham."

[**L. schwarzi** n. sp. Length 6.5 mm.; .26 inch.

Very robust, elongate, convex, brownish when denuded, densely clothed with fine whitish gray pubescence concealing the punctures; antennæ a little longer than the body, incisures black, upperside spotted; thorax wider than long, basal constriction deep, the tubercles on each side small and pointed, pubescence dense, punctulation fine and close, disc with a tubercle on each side of middle behind front margin and one on the centre; scutellum rounded, pubescent; elytra with margin, suture and four slightly elevated lines on each bearing remotely placed black dots, humeral angles polished black; stripe on margin obscure by denudation, at apical fourth a conspicuous, arcuate, black band attaining the sides, behind this another obscurely fuscous, punctuation fine evanescent toward the apices, which are obliquely truncate; legs luteous, femora fuscous at middle, tarsi and apex of tibiæ black, abdomen finely punctured, pubescence rather sparse.

Described from a single example taken at Key West, Florida, by Mr. E. A. Schwarz, and now in his collection.] "Ham."

[**L. alpha** Say, 1827 (*Lamia*), Jour. Ac. Nat. Sci. v, 270; Lec., ed. ii, 329; *Amniscus lateralis* Hald., Tr. Am. Phil. Soc. x, 48; *A. vicinus* Hald., l. c. p. 49; *A. divergens* Hald., l. c. 49; *Liopus alpha. misellus* Lec.; *rusticus* Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 173.

Length 4-7 mm.; .16-.28 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, District of Columbia, Georgia, Florida, West Virginia, Pennsylvania, Ohio, Michigan, Illinois, Kansas, Texas.

*Cinereus* is here united to *alpha.* The distinction as given by Dr. Horn is feeble:

Surface finely punctured, behind the band almost impunctured.....**alpha.**
Surface more coarsely punctured, behind the band very distinctly so.**cinereus.**

Sets can be selected with the above characters, but between them in a large series many gradations occur which, without violence, cannot be assigned to either. The individuals are protean in form, size, sculpture, vestiture and color, and the result of attempts to separate them into races has not been satisfactory. Say describes the species as follows:

"Elytra each with a white oblique line extending backwards from the middle of the suture. Body dull reddish brown; head longitudinally deeply indented on the vertex; antennæ considerably longer than the body; incisures blackish; thorax above destitute of tubercles, but with three small black spots placed 2, 1;

a short tubercle abruptly acute at tip each side before the posterior angles, which are emarginate; posterior margin with a transverse indented line: scutel blackish; elytra irregularly punctured; a few black dots, consisting of tufts of hair, chiefly along the suture; region of the scutel dusky; a blackish marginal abbreviated line from the humerus; a blackish line margined with gray, extends from the middle of the suture, obliquely backwards, towards the exterior margin. Not rare in Pennsylvania, also in N. W. Territory."

Some of the variations are:

*a.* Elongate, surface color cinereous, densely clothed with fine grayish pubescence, angular band of elytra very acute, punctuation fine, nearly obliterated behind, four rows of minute black dots.

*b.* Less elongate, surface color cinereous, pubescence shorter and less dense, punctuation coarser, evident behind the elytral angular band, rows of black dots much interrupted, and in some examples obsolescent.

*c.* Surface color reddish testaceous, pubescence short and inconspicuous punctuation of elytra moderately coarse, a little finer toward apex; black dots sparse; three slightly elevated lines are present in some examples.

*d.* Small (.16 inch), robust, surface reddish brown, rather coarsely punctured, pubescence rather sparse, elytral band mostly wanting, or existing only in a trace, occasionally well marked.

*e.* Var. *floridanus.* Length .16–.22 inch. Surface reddish brown, antennæ annulate, joints spotted with fuscous; four conspicuous series of black dots on each elytron, punctuation not much finer a little sparser toward apex; the posterior band is more obtusely angled than usual, but not so much so as in *fascicularis*, which seems to be scarcely more than a variety of *alpha.* Taken abundantly by Mr. Schwarz at Bay Biscayne, Florida.] "Ham."

**L. punctatus** Hald., 1847 (*Amniscus*), Trans. Am. Phil. Soc. x, 49.

Length 5–6 mm.; .20–.25 inch. *Habitat.*—Wisconsin, Canada, New York, New Jersey.

[This differs from *alpha* chiefly by the absence of the angular line on the elytra, which is replaced by an obscure transverse band of gray.] "Ham."

[**L. foveatocollis** n. sp. Length 3.5–5 mm.; .14–.20 inch.

Elongate, narrow, a little depressed, testaceous, pubescence short, fine and inconspicuous, elytra ornamented; antennæ rufotestaceous, not annulate, twice longer than the body in both sexes; thorax more than one-half wider than long, evenly rounded on the sides, which are strongly spinose, disc smooth, without tubercles, spots or medial line, a round fovea on each side of middle in front of base, some inconspicuous patches of denser white pubescence, punctulation dense,

nearly invisible; elytra smooth, punctuation fine, obsolete toward the tips, which are obliquely truncate, ornamentation variable, but always on each behind middle a conspicuous M-like fuscous mark bordered in front with white, behind which are several indefinite fuscous spots, the margins are more or less fuscous with pale indentations, on each side of the scutellum two short stripes which may be prolonged backward interruptly; underside and legs fusco-luteous.

In this species there is no trace of black points or dots, and the thoracic foveæ is an unusual character. Characterized from five examples taken by Mr. E. A. Schwarz at Biscayne Bay, Florida, now in his collection.] "Ham."

**L. setipes** Casey, 1891, An. N. Y. Acad. Sci. vi, 48.

Length 7 mm.: .28 inch. *Habitat.*—Texas.

[Described as moderately robust, convex, piceo-testaceous, densely clothed with dark luteous pubescence; elytra coarsely punctate, three costiform lines on each and a large lateral blackish spot, recumbent pubescence unusually long, angulate white fascia behind the middle, tibiæ with long flying hairs.] "Ham."

## DECTES Lec.

**D. spinosus** Say, 1827 (*Lamia*), Jour. Acad. Sci. v. 271; Lec., ed. ii, 330; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 144; *texanus* Lec., 1862, Proc. Ac. Nat. Sci. p. 39.

Length 8–10 mm.; .32–.40 inch. *Habitat.*—Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Louisiana, Texas, New Mexico. Colorado. Iowa.

[Elongate, cylindrical, concolorous, piceous, densely cinereo-pubescent throughout; antennæ longer than the body, annulate; elytra moderately punctured, each puncture bearing a suberect black hair; female with a short, black, exserted ovipositor. A neat insect, resembling *Saperda concolor;* abundant. Breeds in the stems of *Ambrosia*, especially *artemisiæfolia* (ragweed), in which the larvæ hibernate.] "Ham."

## MECOTETARTUS Bates.

In this genus the male antennæ are four or five times as long as the body, ciliate beneath, the third joint reaches the extremity of the elytra, the fourth joint three times longer than the third, with an apical tuft of stiff black hairs, the seven following united not longer than the fourth. The elytra are parallel, a little compressed at the sides and obliquely truncate at apex; the prothoracic spine is near the base.

**M. antennatus** Bates, 1872, Tr. Ent. Soc. London, p. 213; *Eutessus asper* Lec., Class. 1873, p. 339; New Species (S. M. C. No. 264), p. 235.

Length 14 mm.; .56 inch. *Habitat.*—Lower California to Chontales, Nicaragua.

"Black, pubescence cinereous, dense and short, not intermixed with hairs: thoracic surface a little inequal, sparsely punctured, variegated: elytra sparsely punctured, with black granulations, a few asperities, a black sublateral vitta extending from the base beyond the middle."—LeConte.

## LEPTURGES Bates.

In this genus the sides of the thorax are angulate close to the base; the antennæ are scarcely fimbriate beneath, the pro- and mesosternum linear scarcely separating the coxæ, the first joint of the posterior tarsi is as long as the others united. The following analytical table is that of Dr. Horn (Tr. Am. Ent. Soc. vii, 126), suitably modified:

Lateral prominence of the thorax rather broad and very close to the base. **symmetricus.**

Lateral prominence more slender and acute, the tip recurved, less close to base.

Elytra lineate, eyes prominent.....**megalops.**

Elytra fasciate.

The fascia behind the middle incomplete, broadly interrupted by the suture. **signatus.**

The fascia broad, black and entire, oblique on each elytron, apex not black. **querci.**

The fascia broad, black and entire, transverse, the apex also black. **facetus.**

Elytra cinereous, each maculate with six round black spots; thorax with four spots.....**regularis.**

**L. symmetricus** Hald., 1847 (*Leiopus*), Tr. Am. Phil. Soc. x, 50; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 171: *Leiopus confluens* Hald., l. c.: *pictus* Lec., l. c.: *angulatus* Lec., l. c. p. 172; *Valenus inornatus* Casey, An. N. Y. Acad. Sci. vi, 50.

Length 7-9 mm.; .28-.36 inch. *Habitat.*—Iowa, Wisconsin, Michigan, Canada, New York, New Jersey, Pennsylvania, West Virginia, Georgia, Florida, Louisiana, Kansas, Texas.

[The synonymy is less from differences in taxonomy than from color ornamentations; *pictus*, the form most commonly met with is pale, with short gray pubescence; four spots on the thorax, two spots on each elytron near to the base and close to the suture, a lateral stripe before middle connected with a broad, irregular, transverse band seldom attaining the suture, and three spots in front of apex arranged in the arc of a circle often united, black. From this these markings vary in both directions, so as to become nearly suffused or entirely wanting, as in *inornatus*.] "Ham."

**L. megalops** n. sp.

[Elongate, narrow, parallel, piceous black throughout, shining with dull luster, pubescence cinereous, very fine, short and inconspicuous above, longer on the abdomen, two obscure, narrow, interrupted lines of grayish or reddish pubescence on the disc of each elytron. Head smooth, minutely punctate: front convex,

with fine median line; eyes moderately coarsely granulate, large, prominent, not very deeply emarginate nor widely separated above; antennæ twice as long as the body, not annulate. Thorax nearly twice wider than long, smooth, scarcely perceptibly punctulate, a basal marginal row of punctures, spine strong, prominent; scutellum rounded, punctate. Elytra with moderately fine, evenly disposed punctures gradually finer toward apex, before which they become obsolete, apices obtusely rounded. Length 5–6 mm.; .20–.24 inch. *Habitat.*—Florida (Bay Biscayne).

Described from two examples without sexual distinction. The types are now in the collection of Mr. E. A. Schwarz.] "Ham."

**L. signatus** Lec., Jour. Acad. Nat. Sci. ser. 2. ii, 171.

Length 6–6.5 mm.: .24–.26 inch. *Habitat.*—Canada. New York, New Jersey, Pennsylvania, Ohio, West Virginia, Georgia, Florida, Iowa, Illinois.

[The elytra in this species are ornamented each side with a spot near base, one at the side a little behind it, a smaller spot at middle near suture and another on the disc a little in advance, behind this a broad band not attaining the suture prolonged backward along the margin arcuately till near apex, where it curves suddenly inward and forward forming a c-like figure, black. These markings are seemingly quite constant. Mr. Leng has taken this species near New York on dead twigs of sumach.] "Ham."

**L. quercí** Fitch, 1858, Tr. N. Y. State Agric. Soc. p. 796; *seperatum* p. 16.

Length 4.5–6 mm.; .18–.24 inch. *Habitat.*—Canada, Michigan, New York, New Jersey, Pennsylvania, Ohio.

[Thorax dark, with a narrow discal line of gray pubescence, and a broad one on the sides; elytra light colored, bearing dark markings as follows: suture to posterior band, joining the suture at base a quadrate spot emarginate behind, a lateral stripe in front of middle, to which is joined a shorter one emarginate behind, a small discal spot at middle, a sutural one frequently joined to an irregular broad band behind the middle extending a little on the sides forward and backward, and a submarginal spot near apex; a large apical area light colored; antennæ not annulate, two and one-half times longer than the body. I have raised this species abundantly from dead oak limbs, and likewise from hickory; from butternut (*Juglans cinerea*), Chittenden.] "Ham."

**L. facetus** Say, 1827 (*Lamia*), Jour. Acad. Nat. Sci. v, 221; Lec., ed. ii. 329; Lec., Jour. Ac. Nat. Sci. ser. ii. 171; Fitch, Rep. iv, p. 65 (separ.).

Length 3–4 mm.; .12–.16 inch. *Habitat.*—Massachusetts, New York, New Jersey, Pennsylvania, West Virginia, Ohio, Michigan.

[This small species is black, except a broad L-shaped mark extending obliquely from within the humerus to the suture, the arm

not reaching the side, and a bilunate fascia on the declivity, palid; the legs and antennæ are obscure and not annulated, the latter more than twice longer than the body. Bred abundantly from dead beech and hickory.] "Ham."

**L. regularis** Lec., 1862, Proc. Acad. Nat. Sci. p. 39.
Length 7-9 mm.; .28-.36 inch. *Habitat.*—Kentucky, Ohio.

This is a beautiful species, having the thorax ornamented with four round black spots and the elytra each with six. This and the three preceding have the markings of the elytra figured by Dr. Horn, Tr. Am. Ent. Soc. viii, pl. ii.

### HYPERPLATYS Hald.

Differs from *Lepturges* by the form of the elytra, the sides being abruptly declivous and limited by an acute ridge. The body above is clothed more or less densely with cinereous pubescence, more or less maculate as follows: four round spots forming a transverse arc on the thorax, rarely an additional spot before the scutellum; a larger spot, sometimes wanting, sometimes enlarged to a short transverse fascia, and numerous smaller spots on each elytron. Rarely the maculation disappears entirely and the upper surface becomes black. These differences, as well as those existing in the width of the body, the length of the antennæ, the color of the legs, and the spinous prolongation of the elytra merge imperceptibly in a large series and appear to me to indicate only races of one species separable only when captured at places geographically distant. The races known to me are as follows:

Body above maculate.
- Larger, legs pale, entire body pale with cinereous pubescence. **californicus.**
- Smaller, legs dark, color darker; elytra twice as long as wide... **aspersus.**
- Smaller, legs dark, color darker; elytra not as long as wide.... **maculatus.**
- Smaller, legs partly rufous, darker; spots confluent..... **nigrellus.**

Body above black..... **femoralis.**

And I consider all as one species under the oldest name, *H. aspersus* Say.

**H. aspersus** Say, 1823 (*Lamia*), Jour. Acad. Nat. Sci. iii, 330; Lec., ed. ii, 187; *maculatus* Hald., Trans. Am. Phil. Soc. x, 49: Lec., Jour. Acad. Nat. Sci ser. 2d, ii, 170; *nigrellus* Hald. l. c.; *femoralis* Hald., l. c.; Lec., l. c. p. 171; *californicus* Casey, Ann. N. Y. Acad. Sci. vi, 51.
Length 3.5—6.5 mm. = .14-.26 inch. *Habitat.*—Canada, Maine, Vermont, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, District of Columbia, Georgia, Alabama, Mississippi, Louisiana, Missouri, Michigan Wisconsin, Iowa, California.

[By the table the several forms may be readily separated into races or species as they may be viewed. In *aspersus* the antennæ ♂ and ♀ are more than twice as long as the body, and on the elytra are three rows of small spots (sometimes indistinct) placed on three lines a little paler than the general surface; in *maculatus* the antennæ of ♂ are about twice as long as the body and the elytral spots much larger and irregularly disposed; in *nigrellus* the antennæ are as in *aspersus*, and the elytral spots larger than in *maculatus*, some of them frequently confluent; examples of *californicus* received recently by Mr. Leng, taken in Santa Cruz Mountains by Mr. Koebele, show that it does not differ from the eastern races except as stated in the table. Breeds in the dry twigs of *Populus monilifera* and *tremuloides* (Schwarz); in apple twigs (Riley)] "Ham."

### Acanthocini.

The presence of an ovipositor in the female is the chief character separating this group from the *Liopi*. The genera as defined by Dr. Geo. H. Horn and Messrs. Bates and Gahan in Tr. Am. Ent. Soc. viii, 128; xiii, Proc. Section, p. xii; and xv, 300, are as follows:

Body above with erect hairs mixed with the pubescence.
- Mesosternum broad; antennæ not much longer than the body and not ciliate beneath, except feebly on the scape.....**Graphisurus.**
- Mesosternum narrow; antennæ twice as long as the body, ♂, and very slender, ciliate beneath .....**Ceratographis.**

Body above pubescent, without erect hairs.
- Mesosternum moderate; antennæ very long, joints 3–4 at least densely fringed beneath with short hairs; lateral tubercle of thorax distant from base. **Acanthocinus.**
- Mesosternum broad; antennæ moderate, not fringed beneath; lateral tubercle of thorax close to the base.....**Nyssodrys.**

### GRAPHISURUS Lacord. *Urographis* Horn.

This genus at present contains two species:

**G. triangulifer** Hald., 1847 (*Acanthoderes*), Tr. Am. Phil. Soc. x, 45; Lec., 1852, Jour. Acad. Nat. Sci. ser. 2d, ii, 174.

Length 13 mm. = .52 inch. *Habitat.*—Ohio, Missouri, Texas, Louisiana, Alabama, Georgia.

[The surface color is reddish brown; the fifth ventral in the female is prolonged and triangularly emarginate at tip, the tarsi in both sexes are alike in width, the antennæ are annulate, the thorax has a broad dark stripe down the middle extending on the elytra behind the scutellum; the surface of the elytra is sprinkled over with small black dots and blotches, and behind the middle from the sides but

not reaching the suture is a broad blotch with several angles, behind which are one or two smaller spots on the margin. The larva was found boring under the bark of *Celtis texana* on injured trees, by Mr. Schwarz.] "Ham."

**G. fasciatus** DeG. 1775 (*Cerambyx*), Mem. v, 114, pl. 14; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 175; *mixtus* Fab., Ent. Syst. Suppl. p. 144; *pensylvanicus* Gmel. ed. Linn. i, 4, p. 1863; *despectus* Lec., Agass. Lake Superior, p. 234; *pusillus* ‡ Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 175; Fitch, Rep. v (An. Rep. N. Y. State Ag. Soc. 1858, p. 794); separat. p. 14.

Length 8-14 mm. = .32-.56 inch. *Habitat.*—Canada, Maine, New Hampshire, Vermont, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, West Virginia, Florida, Louisiana, Kansas, Lake Superior, Michigan, Wisconsin.

[Surface color whitish testaceous, last ventral in ♀ prolonged and deeply cleft at tip, anterior and middle tarsi of ♂ broader than in ♀ and ciliate at the sides, antennæ and legs annulate; thorax bilineate with black, surface of elytra sprinkled with small dark dots and blotches, the latter forming an irregular fascia in front of middle and another more conspicuous in front of the declivity, both frequently obscure or wanting. The name *despectus* (*pusillus* ‡) was applied to small individuals without the band. An abundant species. Breeds in the bark of recently felled or deadened biennial oaks (*Quercus tinctoria*, etc.); also in that of maple (*Acer*), Packard.] "Ham."

## CERATOGRAPHIS Gahan.

**C. biguttata** Lec., 1852 (*Liopus*), Jour. Ac. Nat. Sci. ser. 2d, ii, 172.

Length 9 mm. = .36 inch. *Habitat.*—Canada, New Hampshire, Massachusetts, New Jersey, Pennsylvania, Lake Superior, Michigan. Rather rare.

[Form elongate, scarcely depressed, testaceous, pubescence brownish; elytra indistinctly mottled, each with an oblique black band behind the middle.] "Ham."

## ACANTHOCINUS Steph.

The following synopsis is by Dr. Horn, Trans. Am. Ent. Soc. viii, 130:

Elytra punctured beyond the middle; antennæ of ♂ not nodose.
  Elytra not distinctly costulate.....**obsoletus.**
  Elytra distinctly tricostulate.....**obliquus.**
Elytra scarcely at all punctured behind middle; antennæ ♂ nodose.
  Elytra scarcely punctured at base, surface with three dark oblique bands. **spectabilis.**
  Elytra feebly punctured at base, surface with linear and arrow-shaped velvety spaces.....**nodosus.**

**A. obsoletus** Oliv., 1795 (*Cerambyx*), Ent. iv, 67, p. 130, pl. 13, fig. 90; *pusillus* Kirby, Faun. Bor. iv, 169; Bethune, ed. p. 75.

Length 10-15 mm. = .40-.60 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, North Carolina, Georgia, Florida, Wisconsin.

[Form elongate, surface color whitish testaceous; thorax dark, with an apical and basal transverse row of four round gray spots, only seen in good examples; elytra coarsely distantly punctured, faint evidence of a costa on each side, some small blotches and three undulated fasciæ, dark; the fasciæ are often broken into blotches.] "Ham."

**A. obliquus** Lec., 1862, Proc. Acad. Nat. Sci. p. 39.

Length 12-16 mm. = .48-.64 inch. *Habitat.*—California, Washington, Utah, Colorado, Kansas, New Mexico, Arizona.

[Differs from *obsoletus* by having on each elytron three raised lines, on which are rows of black points; by having only two fasciæ, the anterior of which is one-third behind the base and extends on the sides to base; and by the much finer, closer punctuation.] "Ham."

**A. spectabilis** Lec., 1854 (*Aedilis*), Proc. Ac. Nat. Sci. Phila. vii, 82; Coleopt. Kansas, 1859, p. 22, pl. 2, fig. 16; *Eutrypanus princeps* Walker, Nat. in Vanc. 1866, ii, 331.

Length 18-22 mm. = .72-1.12 inch. *Habitat.*—Vancouver Island, Washington, Oregon, Nevada, Colorado, New Mexico, Arizona.

[This large species has the antennæ near three and one-half times longer than the body, ♂, and about twice as long, ♀; in addition to the three undulated fasciæ of the elytra there is an antebasal narrower one. This species breeds in pine stumps and logs.] "Ham."

**A. nodosus** Fab., 1775 (*Lamia*), Syst. Ent. p. 164; Oliv., Ent. iv, 67, p. 75, pl. 14, fig. 103; Lec. (*Aedilis*), Jour. Acad. Nat. Sci. 2d ser. ii, 174; *bifidator* ♀, Fab., Syst. El. ii, 286; *Astynomus* Dej., Cat. 3d ed. 363.

Length 20-25 mm. = .80-1.00 inch. *Habitat.*—New Jersey, Pennsylvania, Maryland, Florida.

[This species is wider and more depressed than the preceding and with a different facies; the antennæ, ♂ and ♀, are of the same length as in the preceding, but in that the distal end of the fifth joint is nodose-like from some short bristles, while in this the distal end of the third and fourth joints are nodose from enlargement; the surface color is luteous-white, the pubescence grayish white and exceedingly dense and short; there are on the elytra each side four penicillate elevated lines the inner two of which are united before apex, where they are ornamented with an arrowhead-shaped velvety black mark inclosing a white spot; a short line at base on disc and

the sides of the thorax and sides of elytra to middle also velvety black. Breeds in logs of yellow pine, the larva boring under the bark (Schwarz).] "Ham."

**NYSSODRYS** Bates.

[This genus at present is represented in the United States by one species.

**N. haldemani** Lec., 1852 (*Liopus*), Jour. Acad. Nat. Sci. ser. 2d, ii, 173; *contempta* Bates, Ann. and mag. Lond. ser. 3, xiii, 152; Tr. Ent. Soc. London, p. 220.

Length 6.5–8 mm. = .36–.32 inch. *Habitat.*—Pennsylvania, Georgia, Alabama.

Brown, thorax ornamented with four yellowish lines, the inner two conspicuous; the elytra are rather convex and narrowed to apex from before middle, on each side two costæ united before tip, and ornamented with irregular yellowish streaks.] "Ham."

Tribe IX. Pogonocherini.

[The tribe as here defined, contains species of small size, and usually with long erect (flying) hairs in addition to the ordinary pubescence. They are related to the *Acanthoderini*, having divaricate claws, a rather stout body and the scape of the antennæ without cicatrix. They differ from *Liopus* in the shorter and stouter scape of the antennæ. The arrangement of the genera is that in the "Classification" and divided into groups, Tapeinæ being added.

The posterior coxæ widely separated, antennæ not ciliate beneath . VI. TAPEINÆ.
The posterior coxæ approximate; narrowly separated.
Middle tibiæ with external sinus: thighs clavate; vertex concave; antennal tubercles prominent ..... 2.
Middle tibiæ without external sinus; thighs not clavate, vertex flat or convex; antennal tubercles not prominent ..... 5.
Middle tibiæ with external sinus; thighs stout, not clavate.
Eyes coarsely granulate, vertex convex ..... V. ZAPLOI.
2. Eyes moderately granulated, scape of antennæ uniformly punctured ..... 3.
Eyes coarsely granulated; scape with large punctures intermixed ..... 4.
3. Lower lobe of eyes elongate ..... II. HOPLOSIÆ.
Lower lobe of eyes as wide as long ..... III. POGONOCHERI.
4. Lower lobe of eyes broader than long ..... I. ESTOLÆ.
5. Eyes coarsely granulated, lower lobe as wide as long; scape of antennæ uniformly punctured ..... IV. EUPOGONII.

Group TAPEINÆ.

*Peritapnia* Horn, represents this group in our fauna, and is placed provisionally here, having many characters of the Tribe. The anterior coxal cavities are slightly angulate, the middle closed externally, the middle tibiæ with a sinus externally near the apex; the

claws are divaricate; the head is similar in the sexes, eyes coarsely granulate and deeply emarginate, front broad, vertical, antennæ widely separated at base, longer than the body in both sexes, not ciliate beneath; thorax strongly angulate at the sides; scutellum semicircular; apices of the elytra entire, rounded; coxæ all widely separated.

**P. fabra** Horn, 1894, Coleop. Baja Cal. (Pr. Cal. Acad. Sci. ser. 2, iv, 404.
Length 9.5 mm. = .38 inch. *Habitat.*—Arizona south of Tucson.

"Dull brown, clothed with short, fine, brownish pubescence; elytra with short, erect black hairs, arising from evenly disposed muricate punctures. Head finely and moderately closely punctate. Thorax much broader than long, sides strongly angulate at middle, in front of angulation the sides are oblique, behind sinuate, surface finely punctulate and pubescent, with short erect hairs arising from sparsely placed coarser punctures. Elytra very minutely punctulate and finely pubescent, with erect hairs arising from muricate punctures equally placed over the surface, but not in striæ. Body beneath and legs paler, sparsely finely punctate and pubescent," Horn.] "Ham."

**ESTOLA** Fairm. is the only genus in the group ESTOLÆ.

**E. sordida** Lec., 1873, New Species (S. M. C. No. 264), p. 237.
Length 8-13 mm. = .32-.52 inch. *Habitat.*—Cape San Lucas, L. Cal.

Uniformly clothed with yellowish brown recumbent hair intermixed with short, suberect, gray hairs proceeding from the punctures; prothorax armed with long, acute, lateral spine; elytra parallel, rounded at apex; antennæ one-half longer in ♂ and but little longer than the body in ♀.

**HOPLOSIA** Muls. alone represents group HOPLOSIÆ.

**H. nubila** Lec., 1862, Proc. Ac. Phil. p. 39.
Length 9-12 mm. = .36-.48 inch. *Habitat.*—New York, Canada, Michigan, Illinois.

The pubescence is gray mottled with black, and there are short, scattered, erect hairs on the elytra; the antennæ are thinly fringed beneath with hair; the lateral spines of the prothorax are large and situated at the middle; elytra subparallel, separated, rounded at apex; antennæ longer than the body ♂, about as long as body ♀, the scape is stout, clavate, much shorter than third joint. Breeds in dry beech twigs in Michigan (Schwarz); baswood (*Tilia americana*) LeConte.] "Ham."

Group III. POGONOCHERI.

Two genera occur in our fauna separated as follows:

Flying hairs long; prothorax with lateral spines..... **Pogonocherus.**
Prothorax with feebly rounded sides, pubescence short..... **Ecyrus.**

## POGONOCHERUS Latrl.

The following synopsis follows that by Dr. Horn (Trans. Am. Ent. Soc. vii, p. 42):

Elytra truncate at tip and more or less dentate.....1.
Elytra rounded at tip.....2.
1. Legs and sides of elytra with long flying hairs; elytra with moderately large umbone at middle of base.....**crinitus.**
Legs and elytra without flying hairs.
Elytra with lateral costæ well marked and with a row of five or six tufts of erect black setæ.....**penicillatus.**
Elytra without lateral costæ and tufts.....**mixtus.**
2. Elytra with moderately long hairs on the upper surface.
Scape of antennæ short, stout: lateral spine moderate, elytral punctures [obsolete at apical third].....**oregonus.**
Scape of antennæ slender, attaining thoracic spine, which is long and acute.....**volitans.**

**P. crinitus** Lec., 1873, New Species (S. M. C. No. 264), p. 237.
Length 7-9 mm. = .28-.36 inch. *Habitat.*—Vancouver Island; California.

[This species is different in facies from its congeners; it is densely clothed with ash-gray pubescence, a little dotted with white, but without conspicuous spots, and the sides of the thorax are very strongly armed.] "Ham."

**P. penicillatus** Lec., 1850, Agass. Lake Sup. p. 234; Jour. Ac. Nat. Sci. ser. 2, ii, 160.
Length 6 mm. = .24 inch. *Habitat.*—Maine, New Hampshire, Michigan, Lake Superior, Colorado.

[This species is piceous, densely clothed with gray pubescence, on the elytra behind the base; the disc of the thorax is strongly tuberculate; the antennæ and feet are annulate.] "Ham."

**P. mixtus** Hald., 1847, Tr. Am. Phil. Soc. x, 50; Lec., Jour. Ac. Nat. Sci. ser. ii, 160; *parvulus* Lec., l. c.: *simplex* Lec., 1873, New Species (S. M. C. No. 264), p. 237.
Length 5-7 mm. = .20-.28 inch. *Habitat.*—Canada, Maine, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Michigan, Wisconsin, Missouri, Kansas, Colorado, Montana, Idaho, California, Arizona.

[This species in general is piceous black, variegated with white pubescence and hispid with sparse, erect black hairs. In *mixtus* there is a broad band of white pubescence before the middle from the sides seldom attaining the suture and sometimes with a branch to the base inside of the humerus, also a couple of narrow approximate fasciæ on the declivity; the elytra are striately punctured, a little confused near suture. In *simplex* (the western form) the basal band covers the suture extending forward inside of humerus, but

does not attain the margin, the apex behind the declivity is white mottled with dark pubescence, and the striate punctuation of the elytra is feebler and more confused. In *parvulus* the punctuation is as in *mixtus*, but there are no well-marked bands of pubescence, the surface of the elytra being irregularly mottled. The thorax of the ♂ is very closely aciculate, that of ♀ smooth. On pear trees (Leng); in dead branches of willow (Chittenden).] "Ham."

**P. oregonus** Lec., 1861, Proc. Acad. Sci. Phila. p. 254.
Length 8-9 mm. = .32-.36 inch. *Habitat.*—Oregon. California, Idaho (Beaver Canon) Schwarz.

[Black, erect black hairs very long, thoracic disc without distinct tuberculation; elytra parallel, rounded at apex, sides nearly vertical, separated from the disc by a humeral carina, punctuation coarse, sparse, evanescent at apical third, three rows of small black pubescent points, these are sometimes absent, sometimes strong and mixed with white simulating costæ; thorax, scutellar area of the elytra, broad undulated band across middle and many spots in the apical area black from denudation; basal and apical thirds, except the denuded spots, clothed with white pubescence; antennæ slender, testaceous, the joints fuscous at apex; legs spotted and with long flying white hairs.] "Ham."

**P. volitans** Lec., 1873 (*Lophopœum*), New Species (S. M. C. No. 264), p. 232.
Length 5-8 mm. = .20-.32 inch. *Habitat.*—Lower California, Cape San Lucas.

[Clothed with pale brown pubescence, which is mottled on the thorax with darker; the base, sides and apical region of the elytra are dark and mottled with still darker spots; an elongate common stripe of gray emarginate in front and at the sides extends from the humeri to apical third, and is limited externally in its basal half by the inner humeral carina.] "Ham."

## ECYRUS LeConte.

[In this genus the antennæ are very hairy, the anterior tibiæ suddenly thickened at apex, the thorax cylindrical and unarmed, the femora clavate, the vertex between the eyes impressed, and the tips of the elytra roundedly truncate.

The three species at present known in our fauna may be separated thus:

Pubescence silvery white.....**fasciatus.**
Pubescence cinereous.
  Thorax moderately punctured.....**dasycerus.**
  Thorax with only a few punctures at the sides.....**exiguus.**

**E. fasciatus** n. sp.

Length 10 mm. = .40 inch. *Habitat.*—Texas (Brownsville).

Body stout, brownish piceous, pubescence white, in part short and sparse, showing the surface; in part longer and denser concealing the punctures; head densely pubescent, scarcely punctulate, eyes but narrowly separated above; antennæ shorter than the body in the female, longer in the male, pubescent white with long hairs beneath, annulate at the incisures; thorax scarcely wider than long, sides parallel, variegated with patches of denser pubescence, very sparsely punctured, disc convex, with a shallow median groove, in which is a short, polished black line; scutellum quadrate, obtusely rounded behind; elytra with large ocellate punctures more or less confluent, arranged in striæ on the disc, a little confused toward the sides, second interval with three large fascicular tufts of coarse black bristles, one near base, one at middle and one at apical third, a basal fascia, sides and apical half clothed with white pubescence concealing the punctures, a broad band behind the basal fascia not attaining the sides extending arcuately backward to the middle piceous brown; surface with short, semi-erect black hairs sparsely disposed; underside variegated by denser or sparser pubescence; hind tibiæ with white flying hairs.

Described from a male and female taken at Brownsville, Texas, by Mr. C. H. T. Townsend, permission to describe which is due to the courtesy of Mr. L. O. Howard, of the Deparment of Agriculture, through the intercession of Mr. E. A. Schwarz. The types are now deposited in the National Museum at Washington.] "Ham."

[**E. dasycerus** Say, 1826 (*Lamia*), Jour. Ac. Nat. Sci. v, 270; Lec., ed. ii, 328; *Exocentrus dasycerus* Hald.; *E. obscurus* Hald., Tr. Am. Phil. Soc. x, 50; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 160.

Length 6-8 mm. = .24-.32 inch. *Habitat.*—Michigan, Canada, New Hampshire, New York, New Jersey, Pennsylvania, Ohio, West Virginia, North Carolina.

This species is robust, parallel, uniformly cinereous, occiput impressed deeply, antennæ annulate; anterior margin of thorax with two small tubercles at middle, two black facets on middle of disc; the elytra are punctured striately and have four rows on each of erect black fasciculi placed on the suture and three elevated lines; behind the base is a common, narrow, black band, terminating at the middle of the sides.

This species varies from light to dark cinereous. The length given by Say $\frac{8}{20}$ inch. is a misprint for $\frac{8}{10}$ inch. Bred, but not abundantly, from dead hickory limbs.] "Ham."

[**E. exiguus** Lec., 1852, Jour. Ac. Nat. Sci. ser. 2d, ii, 160.

Length 4.5 mm. = .18 inch. *Habitat.*—Ohio, Georgia, Kansas.

Like the preceding species this is also cinereous, but the thorax is scarcely punctured, the elytra are variegated with brownish spots, the elevated lines are scarcely evident, and the tips scarcely truncate;

the antennæ testaceous and scarcely annulate. This seems scarcely more than pauperized individuals of *dasycerus*.] "Ham."

Group IV. EUPOGONII.

[The two genera of this group may be separated as follows:

Body with flying hairs.
  Antennæ not longer than the body, stout pilose, joints 5-10 shorter, subequal; thorax spinose on the sides.....**Eupogonius.**
Body without flying hairs.
  Antennæ longer than the body, slender, ciliate beneath, outer joints very gradually shorter; thorax unarmed.....**Lypsimena.**

Some of the remarks in the "Classification" under Eupogonii seemingly require revision.] "Ham."

**EUPOGONIUS** Lec.

The following is the synopsis by Dr. Horn (Trans. Am. Ent. Soc. xii, p. 196):

Lateral spine of thorax acute, well marked.....2.
Lateral spine of thorax small, obtuse.....3.
  Elytra pale castaneous, the punctuation not strong, almost obliterated near the apex, the pubescence cinereous or yellowish, forming reticulations more or less transverse.....**tomentosus.**
  Elytra piceous, the punctuation coarse, gradually finer, but not obliterated at tip, the pubescence luteous, arranged in irregular small patches. **vestitus.**
  Elytra nearly black, the punctuation rather coarse, finer at apex, but distinct; the pubescence cinereous, fine and very evenly disposed; thorax sparsely evenly pubescent.....**pubescens.**
  Elytra black, coarsely punctured even to the apex, pubescence black and inconspicuous; thorax with a lateral broad line of yellowish pubescence. **subarmatus.**

In addition to the recumbent pubescence mentioned in the able table, the entire body, antennæ and legs, have short, erect hair. *E. subarmatus* has great resemblance in aspect to *Amphionycha flammata*.

**E. tomentosus** Hald., 1849 (*Desmiphora*), Trans. Am. Phil. Soc. x, 50; Lec., Jour. Acad. Nat. Sci. ser. 2d, ii, 159; *pinivora* Fitch, 1857, 4th Rep. separat. p. 26; Trans. N. Y. State Ag. Rep. 1857, p. 712; *Desmiphora* Dej., Cat. 3d ed. 366.

Length 7-8 mm. = .32 inch. *Habitat.*—Canada, Massachusetts, New York, Michigan, Wisconsin, Pennsylvania, New Jersey, Florida.

[A beautifully variegated species shining as if varnished and easily known by the table. Fitch represents his *pinivora* as having the erect hairs on the antennæ and elytra black and not pale as in

*tomentosus*, but this was only an optical illusion. The larva mines the wood of the pine (Fitch); larva bores in twigs of felled yellow pine (Schwarz); the writer bred it once from dead hickory limbs.] "Ham."

**E. vestitus** Say, 1827 (*Saperda*), Jour. Acad. Nat. Sci. v, 273; Lec., ed. ii, 331; *Pogonocherus vestitus* Hald., Trans. Am. Phil. Soc. x, 50; *pauper* Lec., Jour. Acad. Nat. Sci. 2d ser. ii, 159.

Length 6-9 mm. = .24-.36 inch. *Habitat.*—Canada, Vermont, Connecticut, Massachusetts, New York, Michigan, Ohio, Pennsylvania, New Jersey, Alabama.

[Piceous, hirsute; thorax coarsely, nearly confluently punctured; the elytra are mottled with small patches of denser yellowish brown pubescence, which, in the individuals named *pauper*, become transverse lines. I have bred it sparingly from dead hickory limbs; hickory (Riley).] "Ham."

**E. pubescens** Lec., 1873, New Species (S. M. C. No. 264), p. 236.

Length 7-8 mm. = .28-.32 inch. *Habitat.*—Ohio, northern Illinois.

[More slender than *vestitus*, with finer and unmottled pubescence, seems rare.] "Ham."

**E. subarmatus** Lec., 1859 (*Amphionycha*), Coleop. Kansas, p. 22 (Smithson Cont.); Lec., Proc. Acad. Nat. Sci. 1861, p. 354, note.

Length 7-8 mm. = .28 .32 inch. *Habitat.*—Canada, New Hampshire, New York, Michigan, Wisconsin, Iowa, Illinois, Ohio, West Virginia, Pennsylvania.

[This species is sufficiently well defined by the table; it is altogether black, except the yellow lines on the thorax; there is a deep, wide furrow each side of the suture. I have bred this species from elm (*Ulmus americana*); oviposits in stumps of recently felled elm.] "Ham."

## LYPSIMENA Lec.

The two species in our fauna may thus be separated:

Thorax with width and length subequal, a little narrower at base than at apex, sides subsinuate, rather coarsely, very closely punctate..... **fuscata.**

Thorax wider than long, moderately convex, base and apex equal, sides not sinuate, coarsely sparsely punctate..... **californica.**

**L. fuscata** Lec., 1852, Jour. Acad. Nat. Sci. ser. 2d, ii, 155; Chevrolat, Ann. France, 1862, p. 253; *Lypsimena* † *fuscata* † Dej., Cat. 3d ed. p. 374.

Length 6.5-8 mm. = .26-.32 inch. *Habitat.*—New York, North Carolina, Florida, Cuba.

Brownish piceous throughout, pubescence short, cinereous, not concealing the punctures, which, on the abdomen, are black; the suture of the elytra, and an approximate, more or less interrupted

vitta on each side grayish white; eyes narrowly separated above; antennæ slender, longer than the body, reddish testaceous, fuscous at the articulations; scutellum minute, triangular; elytra a little narrowed posteriorly, apices separately rounded, rather coarsely and closely punctured near base, sparser toward apex; legs not clavate.

**L. californica** Horn, 1885. Trans. Am. Ent. Soc. xii, 194.
Length 9 mm. = .36 inch. *Habitat.*—San Diego (California).

[This species has not been seen, but is represented by the describer as resembling *fuscata*, but differing in the form and punctuation of the thorax.] "Ham."

**ZAPLOUS** Lec. Group ZAPLOI.

**Z. hubbardi** Lec., 1878. Proc. Am. Phil. Soc. xvii, p. 415.
Length 3-5 mm. = .12-.20 inch. *Habitat.*—Florida.

"Brown, clothed with short, prostrate, yellowish gray pubescence, somewhat mottled by unequal distribution. Prothorax very densely, rather finely punctured. Elytra more strongly and less densely punctured; antennæ annulated with black, finely punctulate and pubescent, without mixture of large punctures; frequently beaten from old vines in May."—LeConte's description.

### Tribe X. Desmiphorini.

Contains only one species of the genus *Desmiphora*, viz.:

**D. mexicana** Thom., 1860. Class. Longic. p. 75.
Length 15 mm. = .60 inch. *Habitat.*—Mexico, Texas.

"This insect is remarkable for being covered with very dense brown pubescence, with lines and crests of very long, fine whitish hairs looking like mold. Beneath it is very prettily variegated with darker spots, each surrounded with a white line" ("Class." p. 328).

### Tribe XI. Onciderini.

Eyes not very finely granulated, lower lobe elongate; antennæ slender in both sexes, vertex flat.....**Oncideres.**
Eyes very finely granulated, lower lobe not elongate; antennæ with joints 1–4 thickened and hairy in ♂; vertex deeply concave.....**Taricanus.**

**ONCIDERES** Serv.

[Thorax with a distinct lateral spine.
Thorax with a transverse glabrous elevated space; surface densely brownish pubescent, elytra with denuded spots, tuberculiform at base, flat posteriorly.....**pustulatus.**
Thorax without discal callosities.....**texanus.**
Thorax with or without distinct lateral spine; three callosities on the disc in a transverse row, sometimes absent.....**cingulatus.**

**O. pustulatus** Lec., 1854. Proc. Ac. Nat. Sci. Phil. vii, 82.
Length 19 mm. = .75 inch. *Habitat.*—Texas (Laredo, Brownsville). Rare.

**O. texanus** Horn, 1885, Tr. Am. Ent. Soc. xii, 195.
Length 15 mm = .60 inch. *Habitat.*—Texas, Kansas.

Clothed with grayish pubescence, the basal fifth and apical third of the elytra darker, four irregular series of round yellowish spots of denser pubescence; thorax distinctly narrowed behind the lateral tubercle, no dorsal callosities, but the median line may be abraded. Feebly distinct from *cingulatus*.

**O. cingulatus** Say, 1827 (*Saperda*), Jour. Acad. Nat. Sci. v. 272; Lec., ed. ii 330; Hald., Tr. Am. Phil. Soc. x, 52; Lec., Jour. Acad. Nat. Sci. ser. 2d, ii, 165; *putator* Thoms., Physis ii, 81; Horn, Trans. Am. Ent. Soc. xii, 195; *rubiginosus* † Dejean, Cat. 3d ed. p. 369.
Length 14-17 mm. = .56-.68 inch. *Habitat.*—Middle States, New York, New Jersey, Pennsylvania, Louisiana, Texas, Arizona.

Variable in color and sculpture. The pubescence is usually cinereous, very inconspicuous on the basal fifth and apical third of the elytra between which points it is more condensed forming a broad band as in *texana*, and with similar irregular rows of yellow spots. In the form known as *putator*, the integuments are piceo-fuscous, the thorax with a small spine on each side in front of the base and three small black facets on the disc placed transversely, the elytra at base with numerous small granules or tubercles. That known as *cingulatus* is more variable; the pubescence, though usually cinereous, varies to yellowish; the integuments from reddish brown to luteous, the thoracic spine is mostly absent, never conspicuous; the three facets on the disc frequently obsolete, and the basal tubercles of the elytra only occasionally present, and then mostly in examples with a thoracic spine or tubercle. I saw two examples from Georgia with the integuments reddish luteous, the pubescence yellowish and nearly equally distributed on the elytra, and with the rows of yellow spots nearly regular and very conspicuous. More abundant material may show that *texanus* should be united with the present species.

This is the celebrated hickory girdler. In western Pennsylvania it occurs late in August and during September. Though apparently preferring, it does not confine itself to hickory, but likewise occasionally girdles pear, apple, plum, linden, elm and various other trees.] "Ham."

### TARICANUS Thoms.

**Taricanus truquii** Thoms., 1868, Physis i, 5, p. 74.
Length 19 mm. = .76 inch. *Habitat.*—Texas, Mexico.

Gray pubescent, antennæ black, with joints 4–11 pale at base; elytra adorned with black tubercles and numerous fulvous spots;

beneath gray. Elongate parallel; head black, punctate, pubescent; prothorax with two fulvous transverse fasciæ and black tubercles; elytra elongate, parallel, shining, with flattened black tubercles and numerous fulvous spots, apex rounded.

**PROBATIUS** Thoms., Ess. 1860, p. 17.

**Probatius umbraticus** Duval, 1857, Ramond de la Sagra Hist. Cuba, p. 272: Chev., An. Ent. Soc. France, 1862, p. 249; Proc. Ent. Soc. Wash. ii, 39; *jaspideus* † Dejean, Cat. 3d ed. p. 363.

Length 6-10 mm. = .24-.40 inch. *Habitat.*—Florida (Bay Biscayne); Cuba.

[This species, taken in southern Florida by Mr. Schwarz, if not originally native, seems to be successfully naturalized. The following description is translated from that of Chevrolat l. c. With the insect in hand a better description is impracticable.

"Brown, sericeous; head variegated with yellow; thorax spinose each side, transverse, with a double median line yellow, also two others at the sides and one underneath on each side of the same color; elytra punctate at base, obliquely truncate at apex, the outer angle acutely spinose, ornamented with three undulated bands either yellow or white, one at base oblique, one at the middle and a transverse one before apex: also a few dots of the same color; antennæ with joints 3-6 gray at base; legs brownish ferruginous."] "Ham."

**Ataxiini.**

[This tribe is represented in our fauna by two genera which may be thus separated:

Thorax unarmed.....**Aportaxia.**
Thorax armed.....**Ataxia.**

**APORTAXIA** n. g.

Eyes emarginate, moderately coarsely granulate, antennæ ciliate beneath, not setose; thorax cylindrical, unarmed.

**A. lineata** n. sp. Length 11-12 mm. = .44-.48 inch.—Form slender, elongate, parallel, brownish piceous, pubescence rather sparse above, brownish yellow with whitish lineations on the elytra. Head longer than wide, front convex, mouth rather small, last joint of palpi long pointed, a very fine median line from occiput to labrum, antennal tubercles strongly elevated, very finely punctulate, surface concealed by dense grayish yellow pubescence: antennæ a little longer than the body, scape not clavate, two-thirds the length of the third joint, which is slightly shorter than the fourth, joints gradually diminishing in length from the fourth; basal half of all the joints, except the scape, white. Thorax cylindrical, a little wider than long, apex truncate, base bisinuate, median line scarcely visible in front of base, a patch of a few deep coarse punctures on each side of the median line in front of middle; punctuation sparse, irregular, and not very fine, a median stripe, one on each side of it, and the sides with condensed yellowish pubescence; elytra coarsely, sparsely punctate, with irregular punctures,

finer toward apex, apices obliquely rounded, slightly narrowed from the humeri; pubescence cinereous yellow, two stripes on each of denser whitish pubescence forming obscure, irregular vittæ, no erect hairs, surface a little uneven; scutellum triangular, rounded behind, pubescent; underside clothed uniformly with brown-yellow pubescence; front and middle coxæ angulated, open externally, closed behind, moderately separated; thighs feebly clavate, middle tibiæ tuberculate, first joint of hind tarsi not twice as long as the second, fourth nearly as long as the preceding three, ungues divergent.

Described from two examples taken by Mr. C. H. T. Townsend near Brownsville, Texas. The types are now in the National Museum at Washington, their description having been permitted through the courtesy of the Curator, Mr. L. O. Howard.] "Ham."

### ATAXIA Hald.

**Ataxia crypta** Say, 1832 (*Lamia*), New Species, N. A. Insects, New Harmony, Indiana, p. 6; Lec., ed. i, 302; *Ataxia sordida* Hald., Tr. Am. Phil. Soc. x, 56; *Stenidia sordida* Proc. Am. Phil. Soc. iv, 473; *Stenosoma sordidum* Lec., Jour. Acad. Nat. Sci. ser. 2d, ii, 158.

Length 12-15 mm. = .48-.60 inch *Habitat.* - Pennsylvania, Alabama, Louisiana, Texas, New Mexico.

[This species, like the preceding, has the form of a narrow *Elaphidion;* it is piceous-black, densely clothed with short brown pubescence, easily abraded, and hispid with long hairs; the thorax is as wide as long, with a small tubercular spine on each side, and the disc in front of base with a row of eight or nine coarse, black punctures on each side of middle; the antennæ are annulate, longer than the body ♂, shorter ♀, scape as long as third joint; the elytra are parallel, with rows of moderately coarse punctures, a subsutural stria terminating at middle, tip either rounded or subtruncate. Some examples are a little variegated with white. Boring in dry cotton stalks in Texas (Riley); boring in dry twigs of box elder (Negundo) and hackberry (Schwarz).] "Ham."

### Tribe XIII. Hippopsini.

Front coxæ angulated ..... 2.
Front coxæ rounded; antennæ short ..... 3.
2. Antennæ very long ..... **Hippopsis.**
3. Eyes divided ..... 4.
Antennæ very pilose, scape not longer than third joint; eyes emarginate, upper lobe narrow ..... **Dorcasta.**
4. Both lobes of eyes present; scape of antennæ moderate ..... **Sicyobius.**
Upper lobe of eyes wanting; scape of antennæ very long ... **Spalacopsis.**

The species comprised in this group are extremely slender, the thorax is unarmed in all.

### HIPPOPSIS Serv.

**H. lemniscata** Fab., 1801 (*Saperda*). Syst. El. ii. 330; Casteln, Hist. Nat. ii, 1840, p. 493; Lec., Jour. Am. Phil. Soc. ser. 2d, ii, 145; *lineola* Serv., Encyc. Meth. x, p. 336.

Length 10–13 mm. = .40–.52 inch. *Habitat.*—New York to southern Florida (New Jersey, Pennsylvania, District of Columbia, North Carolina), Georgia westward to Texas and northward to Missouri and Ohio; Brazil.

[This insect is long and slender, with antennæ more than twice as long as the body, ♂ and ♀, and fringed with hairs beneath; color of body pale brown; thorax much longer than wide, two white lines on each side; elytra punctate in rows, each with three white lines. This species breeds abundantly in the vines of *Melothisa pendula* at Lake Worth, Florida, also in the stems of *Coreopsis* and *Bidens* (species not determined); in *Ambrosia* in Missouri (Riley).] "Ham."

### DORCASTA Pascoe.

**D. cinerea** Horn, 1860 (*Aegilopsis*), Proc. Ac. Phil. xii, p. 571, pl. 8, fig. 7.

Length 7–10 mm. = .28–.40 inch. *Habitat.*—Texas (San Diego).

Body slender, antennæ not longer than body, densely pilose. The body is densely clothed with erect pubescence, with three yellow vittæ on the thorax, and two on each elytron, and from the distant punctures proceed erect black setæ. The color is piceous, pubescence dark brown, except the elytral and thoracic vittæ. The antennæ are, especially on outer joints, annulate with white.

### SICYOBIUS Horn.

**S. brousii** Horn, 1880. Trans. Am. Ent. Soc. viii, p. 137, pl. ii, fig. 9.

Length 6.5–10 mm.; .26–.40 inch. *Habitat.*—Western Kansas.

Resembles, in form, *Ataxia crypta* without the thoracic spines. Beneath clothed with cinereous pubescence, denuded, forming small black spots; above clothed with pale ochreous pubescence, denser at side of thorax and on the elytra with small spots of white, two of which form slight oblique bands; antennæ but little longer than half the body, pubescent but not ciliate. Taken on the wild gourd (*Cucumis perennis*) by Dr. H. A. Brous, after whom it is named.

### SPALACOPSIS.

[The tribe Hippopsini has the front very long and inflexed. In *Spalacopsis* this is seen in the extreme, the small mouth approximating the prothorax in front of the coxæ, the vertex is anterior, and the antennæ, which are approximate at base, project forward in life. The species in our fauna may thus be separated:

Elytra sulcato-striate.....**linum.**
Elytra with narrowly separated rows of close set punctures.
Elytra without denuded spots.....**suffusa.**
Elytra with denuded spots.....**suturalis.**
Elytra with close, almost confused punctuation.....**texana.**

**S. linum** Duval, 1857 (*Euthuorus*), Ramond de la Sagra, Hist. de Cuba, p. 276, pl. x, fig. 13; Chev., An. France, ser. 4, Tome ii, 256; *stolata* ‡ N. A. collections; *stolata* ‡ Casey, An. N. Y. Acad. Sci. vi, 51.

Length 5–15 mm. = .20-.60 inch. *Habitat.*—Southern Florida, Bahama Islands, Cuba.

Filiform, parallel, head, thorax and elytra equal in width, piceous brown. Head from vertex equal in length to the thorax, closely punctate, grayish brown, with three obsolete gray lines; the antennæ in both sexes nearly of one length, a little longer than the body, hispid with long flying hairs, scape cylindrical and as long as the head from vertex and thorax united; third joint shorter, one-third longer than fourth; joints 5–9 subequal. Thorax cylindrical, much longer than wide, closely punctate, brownish gray, with an inconspicuous median pale stripe and one on each side; elytra brown, variegated with maculations, especially near the suture, apices flattened obliquely and produced on the external side, conjointly producing a deep apical emargination, longitudinally furrowed, the sulcations frequently not very evident, and the elevation of the interstices often feeble, the sulci closely and strongly punctate; underside rather closely, not coarsely punctate, densely grayish pubescent.

This species appears in American collections as *stolata* Newm. The correct identification of *linum* is due to Mr. E. A. Schwarz; more recently I have compared American with Cuban examples. It varies greatly in size and considerably in the sculpture of the elytra. I took it abundantly at Lake Worth, Florida, where it breeds in *Melothria pendula.*] "Ham."

[**S. suffusa** Newm., 1840, Ent. p. 305.

Length 5.5–6 mm. = .22–.24 inch. *Habitat.*—Florida.

Filiform, elytra a little inflated behind middle, piceous brown. Head behind the antennæ and the thorax subequal in length, brown, obscurely trilineate with white; antennæ shorter than the body, ciliate on the underside from the second joint with long flying hairs, scape cylindrical attaining the hind margin of the thorax, third joint one-third shorter, fourth joint two-thirds the length of third, outer joints gradually shorter; thorax much longer than wide, brown, obscurely trilineate with white; scutellum small, wider than long, white; elytra brown, with exceedingly short, narrow, obscure whitish lines; punctures round, small, placed very closely in rows separated by very narrow intervals, a little widened from base to apical third and then roundly narrowed to apex, which is emarginate; apices a little flattened and prolonged.] "Ham."

[**L. suturalis** n. sp.

Length .5 mm. = .20 inch. *Habitat.*—Southern Florida, Punta Gorda.

Very slender, piceous, pubescence cinereous, elytra variegated. Head behind the antennæ mostly shorter than the thorax, piceous, pubescence sparse, not

lineate; antennæ more slender and shorter, joints proportioned as in *suffusa*, flying hairs very sparse; thorax shorter in proportion to the width than in the other species, piceous, pubescence sparse, not lineate; scutellum minute, triangular, white; elytra dilated and punctured as in *suffusa*, suture obscure white, the adjacent two rows of punctures on each side brown from denudation, third row with short white lines, many scattering spots brown from denudation, apices conjointly emarginate.

Described from four examples taken at Punta Gorda on the Gulf coast of southern Florida by Messrs. Schwarz and Hubbard. Three of the types are now in Mr. Schwarz's collection and one in my own.] "Ham."

[**S. texana** Casey, 1891, An. N. Y. Acad. Sci. vi, 51.
Length 10 mm. = .40 inch. *Habitat.*—Texas.

Mr. Casey describes this species as having the elytra inflated to two-thirds wider behind the middle and then narrowed to apex, which is deeply emarginate, the punctuation close and almost confused, maculate with large, irregular denuded spots; and as having dense, recumbent, luteo-cinereous pubescence, the antennæ shorter than the body, and the thorax two-fifths longer than wide.] "Ham."

[**S. stolata** Newm., 1840, Ent. p. 305.
Length .35 inch. *Habitat.*—Florida.

There is at present no Florida species known which corresponds in all respects with Newman's very inadequate description which requires an insect .35 inch. long with sparsely ciliate antennæ shorter than the body, dilated elytra with a much interrupted vitta. By some it has been considered the female of *suffusa*. Its identity with *linum* has likewise been suggested, but that species has hispid antennæ as long as the body and parallel elytra; and besides, Newman's species were taken near Jacksonville, while the northern limit of *linum* seems to be near Crescent City (Schwarz), seventy miles southward. Its status can only be determined by a careful comparison of American forms with Newman's types in the British Museum.] "Ham."

## SAPERDA Fab.

[The following table has been constructed so as to avoid the use of sexual characters:

Elytra separately acuminate at tip; color yellowish brown, with four oblique darker bands.....1. **obliqua.**

Elytra rounded at tip with an acute sutural spine; pubescence cinereous variegated with fulvous, shot with numerous black denuded points, thorax vittate.....2. **calcarata.**

Color nearly uniform, brownish yellow; var. *adspersa* Lec.

Elytra obliquely narrowed and prolonged at tip, slightly dehiscent, coarsely punctate; pubescence thin, cinereous, variegated with fulvous patches; thorax trilineate with fulvous.....3. **mutica.**

Elytra rounded at tip.

Elytra vittate, or with lateral stripes.

Pubescence silvery white; thorax and elytra with three broad, pubescent, brown vittæ.....4. **candida.**

Pubescence cinereous; head and thorax with bright yellow pubescence, six black denuded spots on thorax; elytra with broad marginal and sutural stripe bright yellow.....11. **puncticollis.**

Elytra with broad submarginal stripe and suture narrowly, yellowish scarlet; a broad stripe on each side of thorax; surface piceous, with coarse punctures.....10. **lateralis.**

Elytra with broad submarginal stripe extending on thorax to apex yellowish scarlet, connected with which are three oblique bands which may reach the suture or be mere dents; surface piceous, less coarsely punctate. 9. **tridentata.**

Elytra with white pubescent spots; surface brown.

Thorax with two white stripes, elytra each with two large white spots attaining neither margin nor suture; sides of under surface white. 5. **cretata.**

Thorax with two white stripes; elytra each with a humeral and two subsutural white spots, sometimes obsolescent in the ♂; under surface altogether or with the sides white.....6. **fayi.**

Elytra each with three small denuded spots (sometimes wanting); pubescence dense, uniformly olivaceous or yellowish brown.....7. **vestita.**

Elytra with a transverse undulate fascia; surface color ferruginous to piceous. Larger.....8. **discoidea** ♀.

Elytra unicolorous, not variegated.

Thorax with a broad denuded stripe each side of the median line; elytra coarsely not closely punctate; piceous to ferruginous; underside densely clothed with grayish white pubescence. Smaller....8. **discoidea** ♂.

Thorax with a denser line of gray pubescence each side; black, coarsely punctured, thinly clothed with fine cinereous pubescence; varies; pubescence fulvous, punctures rather coarser (California, Oregon). 12. **mœsta.**

Thorax with pubescence uniform; black, densely clothed throughout with cinereous pubescence, less coarsely punctured.....13. **concolor.**

The outer claw of the front and middle tarsi of the male may be either simple, or with a large basal tooth or obtuse process.

This process is long in *obliqua, calcarata, candida* and *cretata;* moderate in *mutica* and *vestita;* small in *fayi;* that of front feet small, of middle large, in *discoidea* and *tridentata;* short and broad in *lateralis,* and simple in *puncticollis, mœsta* and *concolor.*

The larvæ of all the species of *Saperda* mine under the bark and in the wood of living trees, being often very destructive to fruit and such as are planted for shade. The female is possessed of very

powerful mandibles which she uses to slit the bark of the tree for oviposition. The imagoes are short lived, and are not known to eat or do damage, except as stated; the defoliation of lindens, with which *vestita* is sometimes charged, is due to the larvæ of a lepidopteron.] "Ham."

**S. obliqua** Say, 1826, Jour. Acad. Nat. Sci. v, 274; Lec., ed. ii, 330; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 162.

Length 16–19 mm. = .64–.76 inch. *Habitat.*—Wisconsin, Michigan, Canada, Massachusetts, New York, New Jersey, Pennsylvania, Missouri.

[Entirely yellowish brown ornamented with darker brown, which, on the thorax, consists of four stripes, and on the elytra of four oblique, parallel, raised bands; the tips of the elytra are divaricate and acuminate. This species has been taken by myself and others on black alder (*Alnus serrulata*), though its breeding habits are not yet known. Occurs during a few days about the middle of June.] "Ham."

**S. calcarata** Say, 1823, Jour. Ac. Nat. Sci. iii, 408; Lec., ed. ii. 190; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 162; Harris, Ins. Mass. p. 88; *adspersa* Lec., Agass. Lake Superior. p. 234; Lec., l. c. 162.

Length 25–31 mm. = 1.00–1.25 inch. *Habitat.*—Canada, Wisconsin, Lake Superior, Michigan, Ohio, Pennsylvania, New York, Massachusetts, New Jersey, Missouri, Kansas, Nebraska, Iowa, Vancouver Island, B. C.

[This, the largest of the *Saperdas*, is clothed with gray pubescence diversified with yellow on the head, three stripes on the vertex and some blotches on the elytra, the surface of which is shot with numerous round, black, denuded points, and the suture at tip spinose. This species breeds in the various species of poplar (*Populus*), preferring the older trees. In American linden (*Tilia*) Hubbard. *Adspersa* is a form with uniform yellowish pubescence.] "Ham."

**S. mutica** Say, 1823. Jour. Ac. Nat. Sci. iii, 409; Lec., ed. ii, 191; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 162.

Length 9–15 mm. = .36 .60 inch. *Habitat.*—Canada, New York, New Jersey, Missouri, Kansas, Nebraska.

[This species is smaller than the preceding with the same markings, except that the yellow is more predominant, the form more convex, the antennæ conspicuously annulated with white, the tips of the elytra dehiscent and mutic.] "Ham."

**S. candida** Fab., 1787, Ent. Syst. ii, p. 307; El. Syst. ii, 319; *bivittata* Say, Jour. Acad. Nat. Sci. iii, 409; Lec., ed. ii, 190; Fitch, Rep. 1st and 2d, p. 11; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 163.

Length 15–20 mm. = .60–.80 inch. *Habitat.*—Canada, Maine, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Missouri, Iowa.

[Clothed with dense white pubescence, antennæ and legs with gray; three broad brown stripes extending from the anterior margin of the thorax to the tip of the elytra, one sutural, the others marginal; a bar sometimes unites the marginal and sutural stripes behind the base. This species, when in the larval state, is very destructive to apple and some other fruit trees; also to crab apple (*Pyrus coronaria*), mountain ash (*Pyrus americana*), Juneberry (*Amelanchier*) and hawthorn (*Cratægus*.] "Ham."

**S. cretata** Newm., 1838, Ent. Mag. v. 395.

Length 12-20 mm. = .48-.80 inch. *Habitat.*—Massachusetts, Canada, Michigan, Wisconsin, Iowa, Illinois, Pennsylvania.

[Clothed with brown pubescence; two broad vittæ on the thorax and a narrow discal line, white; a broad elongate stripe of the same color emarginate before and behind one-third behind the base of each elytron extending beyond middle and close to suture, also a smaller spot before apex; the sides of the abdomen and meso- and metasternal side pieces are also white. This species breeds in the limbs of *Cratægus* like the following.] "Ham."

**S. fayi** Bland, 1863, Proc. Ent. Soc. Phil. ii, 320; Can. Ent. xx, 6.

Length 10-12 mm. = .40-.48 inch. *Habitat.*—Canada, New York, New Jersey, Pennsylvania, Ohio.

[This species resembles *cretata*, is of the same color, but smaller; the side vittæ of the thorax extend on the elytra at base, but the discal line is wanting; the anterior elytral spot is reduced to a cylindrical line and separated from that of the opposite side by the suture. The ♂ is much smaller, with the white spots much reduced or wanting, and with the whole of the underside frequently gray. This and *cretata* breed in the limbs of *Cretægus*, and are to be found about the second week of June.] "Ham."

**S. vestita** Say, 1824, Long's 2d Exp. p. 290; Lec., ed. i. 193; *atkinsoni* Curtis, Brit. Ent. p. 275; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 163.

Length 12-19 mm. = .48-.76 inch. *Habitat.*—Canada, Vermont, New Hampshire, Massachusetts, New York, Pennsylvania, Michigan, Wisconsin, Iowa, Illinois, Ohio, New Jersey.

[ A fine insect, densely clothed with light olivaceous pubescence; elytra each with three small round denuded spots, two of which are placed obliquely before and one more distant behind the middle; these spots are not always present. This insect breeds in the linden (*Tilia*), the larvæ sometimes proving very destructive to them when set out as shade trees. The beetle itself does not injure the foliage, as is sometimes stated in agricultural entomology.] "Ham."

**S. discoidea** Fab., 1798, Ent. Syst. Suppl. 147 ♀; *fuscipes* Say ♂, 1827, Jour. Ac. Nat. Sci. v, 273; Lec., ed. ii, 331; Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 163; *Stenostola fuscipes* var. *dorsalis* Hald., Tr. Am. Phil. Soc. x, 56.

Length ♂ 10 mm. = .40 inch.; ♀ 15 mm. = .60 inch. *Habitat.*—Canada, New York, Pennsylvania, New Jersey, Louisiana, Kansas, Nebraska, Illinois, Michigan.

[The sexes are so unlike in size and appearance as to have long been mistaken for species. The color of the integument in either sex may be entirely ferruginous, or entirely piceous above; the legs pale to ferruginous, with the tibiæ and tarsi frequently dark; the punctuation of the thorax and elytra is coarse and deep. Male: pubescence above inconspicuous, grayish when the integument is piceous, yellowish when ferruginous, that of the underside is denser, long and silvery; thorax with a denuded line each side of a more dense pubescent median stripe; antennæ not annulate, brown or ferruginous. Female: the pubescence is grayish yellow, according to the surface color; head, thorax, scutellum, sides and apical region of the elytra and a broad irregular fascia at middle of more condensed pubescence sometimes trilineate on the thorax; underside piceous to rufous, pubescence dense. This species breeds abundantly in hickory (*carya*) and butternut (*Juglans cinerea*) and may be taken during June and July.] "Ham."

**S. tridentata** Oliv., 1795, Ent. iv, 68, p. 30, pl. 4, fig. 48; Lec., Jour. Ac. Nat. Sci. ser. 2d ii, 164; *compsidea* var. *dubiosa* Hald., Proc. Am. Phil. Soc. x, 55; Fitch, Rep. v. (An. Rep. N. Y. State Agric. Soc. 1858, p. 839); separat. p. 59.

Length 9-13 mm. = .36-.52 inch. *Habitat.*—Canada, Vermont, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Michigan, Wisconsin, Illinois, Iowa.

[Piceous, densely clothed with very fine inconspicuous gray pubescence above, longer beneath; the stripes on the elytra are submarginal, from which proceed obliquely backward three bands which may be mere dents or prolonged to the suture meeting those of the opposite side. The thorax has often two black spots on each side and each elytron three. The larvæ frequently destroy the white elm (*Ulmus americana*) when planted as a shade tree, and have been found under the bark of the slippery elm (*U. fulva*) Fitch, and under that of maple (*Acer*) Harrington.] "Ham."

**S. lateralis** Fab., 1775. Syst. Ent. p. 185: Ent. Syst. 2, 312; Syst. El. 2. 223; Oliv., Ent. iv, 68, p. 17, pl. 4, fig. 41; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 164; Fitch, Rep. v (An. Rep. N. Y. State Agric. Soc. 1858, p. 840); separatum p. 60.

Length 9-15 mm. = .36-.60 inch. *Habitat.*—Canada, Vermont, Massachusetts, New York, Pennsylvania, New Jersey, Virginia, West Virginia, Ohio, Michigan, Wisconsin, Illinois, Iowa.

[Piceous, rather coarsely punctured, pubescence gray, very inconspicuous above and mixed with short, semi-erect hairs; the sutural scarlet line mentioned in the table is oftener absent than present. Breeds in hickory, elm, and in witch hazel (*Alnus serrulata*).] "Ham."

**S. punctricollis** Say, 1824, Jour. Ac. Nat. Sci. iii, 406; Lec., ed. ii, 188; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 164; Randall, Bost. Jour. ii. 43.
Length 9–10 mm. = .37–.40 inch. *Habitat.*—Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Louisiana, Arkansas, Kansas, Nebraska.

[Piceous, pubescence gray and not dense; the head, thorax, margins of the elytra and a broad sutural stripe are clothed with dense, bright yellow pubescence; a round frontal spot, one on the occiput, four placed quadrangularly on the disc of the thorax and one on each side, black from denudation. This species breeds in the poison ivy (*Rhus radicans*), and may be taken during a few days about the middle of June.] "Ham."

**S. mœsta** Lec., 1850, Agass. Lake Superior, p. 234; Can. Ent. vi, 61.
Length 8–9 mm. = .32–.36 inch. *Habitat.*—Lake Superior, Canada, Michigan, New York, Pennsylvania, Ohio, Oregon, California.

[Readily known by the characters in the table; there is on the thorax two gray stripes of denser pubescence and the antennæ are annulate; the pubescence of the Pacific coast form is fulvous. Breeds in the small branches of various poplars (*Populus*).] "Ham."

**S. concolor** Lec., 1852, Jour. Ac. Nat. Sci. ser. 2, ii, 163; Can. Ent. xx, 7; *Mecas inornata* ‡ Walsh, Proc. Ent. Soc. Phil. vi, 264; *inornata* ‡ Packard, Forest Insects, p. 427, text but not fig.
Length 11 12 mm. = .44–.48 inch. *Habitat.*—Canada, Massachusetts, New York, New Jersey, Pennsylvania, Michigan, New Mexico.

[Black, resembling *mœsta*, but the pubescence and punctuation are much finer and denser; as in it the antennæ are annulate. Breeds abundantly in the canes of willow (*Salix longifolia*), and also in the base of young poplars (*Populus*).] "Ham."

### Tribe XV. Phytoeciini.

Episterna of metathorax wide.
  Epipleuræ indistinct; ungues feebly toothed or cleft..... **Mecas.**
  Epipleuræ distinct; ungues broadly appendiculate..... **Oberea.**
Episterna of metathorax moderate.
  Eyes broadly divided; prothorax dilated on the sides.
    Ungues broadly appendiculate..... **Tetrops.**
    Ungues cleft..... **Tetraopes.**
  Eyes not divided; ungues cleft.
    Antennæ pilose, outer joints suddenly shorter..... **Amphionycha.**

**MECAS** LeConte.

[The species of this genus resemble the smaller *Saperdas*, but their breeding habits are different, being in the stems of plants and weeds so far as known]. They may be separated by the following table, which is based on that of Dr. Geo. H. Horn, Tr. Am. Ent. Soc. vii; Blanchard, in Ent. Amer. iii, 86 and Gahan, Tr. Am. Ent. Soc. xv, 300:

Body above concolorous.
- Legs black; thorax usually with two feeble callosities; body above uniformly clothed with cinereous pubescence.
  - Claws moderately deeply cleft, the inner division acute.....**cana.**
  - Claws more deeply cleft, the inner division broad and lobe like.**inornata.**
- Legs black; thorax without callosities; body above sparsely clothed with cinereous pubescence. thorax at sides and middle, elytra at suture and sides more densely clothed with yellowish white pubescence.**marginella.**
- Legs, or at least the femora, red.
  - Thorax with four or five callosities; surface sparsely cinereo-pubescent, suture and margin more densely.....**pergrata.**
  - Thorax without callosities, surface very sparsely pubescent; femora red, tibiæ usually dark .....**femoralis.**

Body above bicolored; head and thorax reddish yellow.
- Elytra very sparsely cinereo-pubescent, suture more distinctly...**ruficollis.**

**M. cana** Newm., 1840 (*Saperda*), Ent. p. 12; *Stenostola saturnina* Lec., Coleop. of Kansas, 1859, p. 21 (Smith. Cont. xi); Tr. Am. Ent. Soc. xv, 300.

Length 8-12 mm. = .32-.48 inch. *Habitat.*—Kansas, Texas, Florida.

**M. inornata** Say, 1824 (*Saperda*), Jour. Ac. Nat. Sci. iii, 407; Lec., ed. ii. 189: *Saperda cinerea* Newm., 1840, Ent. p. 13; *senescens* Bates, Biol. Cent. Amer.; Am. Ent. iii, 86; Horn, Tr. Am. Ent. Soc. xv, 301.

Length 8-15 mm. = .32-.60 inch. *Habitat.*—Nevada, Dakota, Colorado, Nebraska, Wisconsin, Iowa, Missouri, Kansas, Texas, Louisiana, Mexico.

[*M. inornata* ‡ Walsh, Proc. Ent. Soc. vi, 264, is *Saperda concolor*. The characters given in the table are the only ones by which this and the preceding species can be separated, otherwise they seem to be identical.

Black, uniformly clothed above with dense gray pubescence (sometimes yellowish); the thorax may have on each side of the disc a round denuded callus, or this may be wanting; the length is sometimes greater than the width, more often the reverse. *Cana* was described from Florida, and seems to have been differently colored from the Western form, the pubescence grayish white, the elytral and sutural margins also hoary. These two species greatly resemble *Saperda concolor*, but the antennæ are not usually annulate. *Inornata* breeds in the stems of the false sunflower (*Helenium tenuifolium*) Schwarz, and in *Helianthus tuberosus* growing wild.] "Ham."

**M. marginella** Lec., 1873, New Species (S. M. C. No. 264), p. 239.
Length 7-8 mm. = .28-.32 inch. *Habitat.*—Illinois, Texas, Kansas.

[Easily known by the characters in the table.] "Ham."

**M. pergrata** Say, 1823 (*Saperda*), Jour. Ac. Nat. Sci. iii, 408; Lec., ed. ii, 190: *Stenostola pergrata* Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 154; *Stenostola gentilis* Lec., l. c. p. 154.
Length 8-10 mm. = .32-.40 inch. *Habitat.*—Dakota, Nebraska, Colorado, Kansas, Missouri, New Mexico, Texas, Louisiana.

[In addition to the characters in the table it need only be added that the antennæ are annulate, that the underside varies from piceous to rufous, and that the sutural and marginal lines of denser pubescence are usually conspicuous.] "Ham."

**M. femoralis** Hald., 1847 (*Phytœcia*). Tr. Am. Phil. Soc. x, 59; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 155.
Length 7.5 mm. = .30 inch. *Habitat.*—District of Columbia, Georgia, Florida.

[The characters in the table need nothing additional.] "Ham."

**M. ruficollis** Horn, 1878, Tr. Am. Ent. Soc. vii, 44.
Length 12.5 mm. = 50 inch. *Habitat.*—Texas, Mexico.

[The antennæ and elytra are black; the pubescence on the thorax forms denser patches each side of middle and on the sides; the legs vary from black to rufous.] "Ham."

"The sexual characters of *Mecas* are similar to *Oberea*, the last ventral of the male is triangularly concave and the pygidium of the female rather protuberant," Horn.

## OBEREA Mulsant.

The species of *Oberea* differ in the form of the thorax, which may have four, two or no callosities; in the form of the female pygidium, which in two species is strongly protuberant, in the others but feebly so; in the form of the elytral tip, which may or may not be bidentate and emarginate; and in color. In the last respect certain species are constant; others present such variability that a considerable number of names have been proposed, which are now considered synonyms, but which still leave many forms unnamed. The synopsis by Dr. Horn (Trans. Am. Ent. Soc. vii, pp. 45–47, reduced the number of so-called species and an increased number of examples shows that a further reduction is necessary. I would therefore, disregarding the color for the present, arrange the species as follows:

Thorax with four callosities; pygidium of ♀ strongly protuberant.**schaumii.**
Thorax with two callosities; pygidium of ♀ feebly protuberant.
Elytra truncate at tip.....**tripunctata.**
Elytra rounded at tip.....**ocellata.**
Thorax without callosities; pygidium of ♀ feebly protuberant.
Elytra not pubescent.....**gracilis.**
Elytra closely clothed with recumbent pubescence.....**ruficollis.**

**O. schaumii** Lec., 1852, Jour. Ac. Phil. ser. 2, ii, p. 153; *wapleri* Chev., Rev. Zool. 1852, p. 420; *quadricallosa* Lec., 1874, Trans. Am. Ent. Soc. v, p. 68. Length 11-15 mm.; .45-.60 inch. *Habitat.*—United States and Canada.

The color varies greatly. In the palest form the entire insect is flavo-testaceous, except the feet and basal joints of antennæ. In the darkest form, the abdomen, femora, tibiæ and thorax are pale, while the rest of the body, including the thoracic callosities, are nearly black. In the intermediate forms the black color may be traced through different individuals, in a series of which the palest and the darkest forms are simply the extremes. It seems useless, therefore, to tabulate individuals which mimic races and varieties only in meagre collections. Breeds in the living twigs of cotton wood (*Populus monilifera*), Riley.

O. TRIPUNCTATA Swed.—Under this name are included a great many specimens. They may be readily separated into two varieties:

Body beneath black.....var. **bimaculata.**
Body beneath in great part yellow.....var. **tripunctata.**

That the individuals, which can easily be separated by the color of the body beneath, constitute varieties of one species seems to me certain. The black abdomen in the first is usually accompanied by black legs and entirely black elytra, the yellow abdomen of the second by yellow legs, yellowish antennæ, and more or less striped elytra. Yet every large collection will contain specimens of var. *bimaculata* in which the legs are at least brownish and the elytra decidedly yellow through the middle, whereby the black abdomen alone remains to differentiate the varieties. The color of the legs very rarely becomes quite pale, even in the var. *bimaculata*, and such an individual received the name *flavipes* from Haldeman. Other variations also occur in the maculation of the thorax, etc., and the following table will serve to separate the most striking. Individuals occur frequently which will not answer to any of the names.

### Forms of *O. tripunctata* var. *bimaculata*.

Legs nearly or quite black.
Thorax, often the cervix, yellow, without spots.....**affinis** Har.
Thorax with two discal spots and entire basal margin black....**basalis** Lec.
Thorax with two discal spots and an antescutellar spot black.
**tripunctata** Fab.
Thorax with two discal spots only, black.....**bimaculata** Ol.
Legs entirely pale.
Thorax with entire disc black.....**flavipes** Hald.

### Forms of *O. tripunctata* var. *tripunctata*.

Head yellow; thorax with two discal spots only black.....**myops** Hald.
Head yellow; thorax with two discal and antescutellar spots black.
**mandarina** Fab.
Head fuscous; thorax as in *mandarina*.....**tripunctata** Swed.

The elytra in *myops* usually have the lateral fuscous stripe only defined; in the last two the sutural stripe also is well marked.

**O. tripunctata** Swederus, 1787, vet. Ac. nya Handl. p. 197; *mandarina* Fab., Syst. El. ii, p. 321; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 152; *amiabilis* Hald., Tr. Am. Phil. Soc. x, 57: Lec. l. c. 152; *myops* Hald., l. c.; Lec. l. c.; *oculaticollis* Say, 1824, Jour. Ac. Nat. Sci. iii, 406; Lec., ed. ii, 189; *bimaculata* Oliv., 1795, Ent. iv, 68, p. 21, pl. 4, fig. 43; *tripunctata* || Fab., Ent. Syst. i, 2, p. 310; Hald., Tr. Am. Phil. Soc. x, 57; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 153; *affinis* Harris, Ins. Mass. p. 91; *perspicillata* Hald., l. c. p. 57; *basalis* Lec., l. c. 153; *flavipes* Hald., l. c. 57; Lec. l. c. 153; *texana* Horn, Tr. Am. Ent. Soc. vii, 47.

Length 8–17.5 mm. = .32–.70 inch. *Habitat.*—Canada, Michigan, Ohio, Pennsylvania, New York, Massachusetts, New Jersey, District of Columbia, Virginia, North Carolina, Georgia, Florida, Louisiana, Texas, New Mexico, Colorado, Nebraska, Kansas, Missouri, Illinois, Wisconsin, Iowa.

In the *tripunctata* group of TRIPUNCTATA, in addition to the characters in the table, it may be stated that the body beneath is entirely fuscous, or pale yellowish with fuscous spots; the elytra flavotestaceous with sutural and lateral fuscous stripes; the antennæ annulated or not. In *mandarina*, the underside may be entirely fuscous or variegated with yellow; in *myops* the sutural fuscous stripe is wanting, the body beneath is pale with fuscous spots on the sides of the metasternum and second and third ventral segments; *amiabilis* scarcely differs from *mandarina;* the preceding three have the head yellow and the antennæ annulated; another form occurs with the head fuscous and the antennæ not annulated.

In the BIMACULATA group, *oculaticollis* is entirely black clothed with cinereous pubescence, and the elytra obliquely truncate; *bimaculata, tripunctata* || Fab., *affinis, basalis* and two unnamed forms

agree in being entirely black, except the thorax; *basalis* has an antescutellar black spot, and likewise *tripunctata;* two unnamed forms occur, one with the basal margin black, the other with the thorax, often the cervix yellow, with the two callosities yellow instead of black; *flavipes* has yellow legs; *texana* is yellowish testaceous; head, antennæ and elytra black; thorax with two callosities and an antescutellar black spot; elytra truncate and subspinose at tip; abdomen yellow, last segment and sometimes the sides of the second and third fuscous; legs yellow, tips of the tibiæ and tarsi fuscous.

[This species (*tripunctata* || Fab. *perspicillata*) breeds in the canes of the blackberry and raspberry (*Rubus*), sometimes doing great injury; (*mandarina*) in the twigs of cottonwood (*Populus monilifera*), Riley.] "Ham."

[**O. ocellata** Hald., 1847, Tr. Am. Phil. Soc. x, 57; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 152.

Length 14 mm. = .56 inch. *Habitat.*—Michigan, New York, Massachusetts, New Jersey, Georgia, Florida, Louisiana, Texas.

Beneath entirely red; elytra black, epipleuræ black, legs usually pale, tibiæ and tarsi fuscous; the head and thorax are sometimes rufous, sometimes the occiput and disc of the thorax are black with the legs entirely fuscous, and again the head may be entirely black, the thorax rufous, the legs rufous and the tibiæ and tarsi fuscous; the tips of the elytra, while usually rounded, in some examples are slightly truncate, but never emarginate nor spinulose.] "Ham."

[**O. gracilis** Fab., 1801, Syst. Ent. ii, p. 324; Hald., Tr. Am. Phil. Soc. x, 57; Lec., Jour. Acad. Nat. Sci. ser. 2, ii, 152.

Length 10 13 mm. = .40-.50 inch. *Habitat.*—New York, New Jersey, North Carolina, Georgia, Florida.

Pale yellowish testaceous; antennæ fuscous; thorax densely punctured, without callosities; elytra with a fuscous lateral stripe; legs pale, tips of tibiæ and tarsi darker.] "Ham."

[**O. ruficollis** Fab., 1775, Ent. Syst. i, 2, p. 311; Hald. l. c.; Lec. l. c.; *plumbea* Oliv., 1795, Ent. iv, 68, p. 21; *tibialis* Hald., l. c., *femoralis* Lec. (typ. error), l. c. 153.

Length 15-18 mm. = .60-.70 inch. *Habitat.*—Massachusetts to Georgia, Vermont, ~~Massachusetts~~, New York, New Jersey, Ohio, Pennsylvania, Virginia, Kansas.

Pale rufous; antennæ and elytra nearly black, epipleuræ pale at base; thorax without callosities; tibiæ and tarsi fuscous, the anterior rufous. Only one example of *tibialis* is known to be in any collection.] "Ham."

[As the synoptic table of *Oberea* by Dr. Horn (Tr. Am. Ent. Soc. vii, 45) based on color characters may be useful, it is here presented.

**Body beneath and legs, black.**
**Thorax entirely black** ..... **oculaticollis.**
**Thorax in great part yellow** ..... **bimaculata.**
**Body beneath and legs variable, never both at the same time black.**
**Thorax with four distinct callosities, pygidium of female strongly protuberant.** **quadricallosa.** **schaumii.**
**Thorax with two or no callosities; pygidium ♀ feebly protuberant.**
**Body above and beneath entirely black.**
**Form moderately robust, middle and posterior legs black, anterior femora at apex and tibiæ yellow: thorax without callosities** ..... **tibialis.**
**Form very slender; thorax with two callosities; legs entirely yellow.** **flavipes.**
**Body beneath and above yellow.**
**Thorax with callosities.**
**Thorax unicolored.**
**Elytra slightly sinuate at tip, epipleuræ black; abdomen entirely rufous.** **ocellata.**
**Elytra emarginate at tip and subbidentate, epipleuræ pale at base, abdomen tipped with black** ..... **texana.**
**Elytra yellow, with black stripes** ..... **tripunctata** Swed.
**Thorax without callosities** ..... **ruficollis.** **gracilis.**

According to Mr. Leng's table *quadricallosa* enters into synonymy with *schaumii; oculaticollis, bimaculata, flavipes* and *texana* with TRIPUNCTATA Swed.; and *tibialis* with RUFICOLLIS.] "Ham."

## TETROPS Kirby.

Three species occur in our fauna, none of which are common.

**Elytra with grayish recumbent pubescence and erect pale hairs intermixed; legs black** ..... **canescens.**
**Elytra with black recumbent and erect hairs.**
**Legs black, thoracic umbone distinctly elevated** ..... **jucunda.**
**Legs red, umbone scarcely elevated** ..... **monostigma.**

**T. canescens** Lec., 1852, Jour. Ac. Nat. Sci. ser. 2, ii, 157.
Length 11.5 mm. = .46 inch. *Habitat*.—New Jersey, Kansas, New Mexico.

[Black; head, thorax, prosternum and base of antennal joints rufous; thorax constricted before and behind, sparsely punctured and with a large discal callus, black; elytra coarsely punctured. This species has been taken in New Jersey on *Alnus serrulata*.] "Ham."

**T. jucunda** Lec., 1862, Proc. Ac. Nat. Sci. Phil. p. 40.
Length 8-9 mm. = .32 .36 inch. *Habitat*.—Middle States, Nebraska.

[Very like *canescens*, but the pubescence and hairs are black and longer; the coloration is the same.] "Ham."

**T. monostigma** Hald., 1847 (*Oberea*), Trans. Am. Phil. Soc. x, 57; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 156.

Length 7.5 mm. = .30 inch. *Habitat.*—Pennsylvania.

[This species differs from *jucunda* by its smaller size and red legs; the thoracic callus is also smaller. This and *jucunda* are very rare, and have not been seen.] "Ham."

**TETRAOPES** Serville.

The following synopsis is by Dr. Geo. H. Horn, Tr. Am. Ent. Soc. vii, 48:

Elytra with median and apical cordiform black space.
  Disc of thorax black; thoracic umbone suddenly elevated ....**discoideus.**
  Disc of thorax red; umbone gradually convex.....**cauteriator.**
Elytra black, with a red basal band, and triangular red spot behind middle. **elegans.**
Elytra with black spots.
  Antennæ black, not annulate.
    Abdomen very sparsely, scarcely visibly punctulate; mandible of ♂ with deep sinuation at base.....**tetraophthalmus.**
  Antennæ more or less distinctly annulate; abdomen densely but very finely punctulate; mandible of ♂ with moderate sinuation.
    Claws rather deeply bifid; surface rather sparsely clothed with recumbent pubescence and with semi erect hairs visible on the disc.
      Thoracic umbone suddenly elevated, distinctly limited at the sides.
        Surface of umbone opaque; abdomen scarcely punctulate.**collaris.**
        Surface of umbone shining; abdomen densely punctulate. **femoratus.**
      Thoracic umbone gradually convex; antennæ feebly annulated.
        Antennæ and legs dark.....**quinquemaculatus.**
        Scape and femora red.....var. **texanus.**
    Claws feebly cleft at tip; surface more densely clothed with recumbent pubescence, erect hairs very short and visible only at sides and tip.
      Thoracic umbone gradually convex, lateral tubercle not very prominent. **canescens.**

All the species of *Tetraopes* appear in advanced Summer, and breed in the stems and roots of milkweed (*Asclepias*).

**T. discoideus** Lec., 1858, Jour. Ac. Nat. Sci. ser. 2, iv, 26; *rubrocinereus* Thoms., 1860, Classif. Longicorn p. 67.

Length 7-8 mm. = .28-.32 inch. *Habitat.*—New Jersey, New Mexico, Texas, Arizona, Idaho.

[Black, clothed with sparse cinereous pubescence mixed with black hairs; antennæ black, not annulate; thorax red at base and apex; with four black spots on the disc; elytra red, with black markings

as in the table; underside and legs black. There is some variation in the coloration; the head may be black (typical) or red; the thorax may be altogether black, except an apical space on each side of middle; the anterior black space on the elytra may be reduced to a spot, and there may be a round black callus on each side at the outer angle of the apical black space.] "Ham."

**T. canteriator** Drapiez, 1819, Ann. génér. des Sc. phys. ii, 47, pl. 16, fig. 6; Say, Bost. Jour. i, 96; Lec., ed. ii, 666; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 156; *arator* Germ., 1824, Ins. Spec. nov. p. 486; 13-*punctatus* Drapiez, l. c.
Length 8-12 mm. = .32-.48 inch. *Habitat.*—Canada, Massachusetts, New York, Pennsylvania, New Jersey, Ohio, Florida, Alabama, Iowa.

[The elytral markings are as in *discoideus*, and liable to variation by extension or diminution; the thorax is usually red with four black spots; the scutellum and elytral umbones are black.] "Ham."

**T. elegans** Horn, 1894, Baja Calif. Coleop. (Pr. Cal. Acad. Sci. ser. 2, iv, 404).
Length 9-12 mm. = .36-.48 inch. *Habitat.*—Lower California (San Jose del Cabo).

"Black, clothed with fine cinereous pubescence, bluish on the thorax, with short, black, erect hairs intermixed; antennæ with grayish blue pubescence on the underside; head red, sparsely punctate; thorax black, umbone abruptly elevated, coarsely punctate and hairy on its summit; scutellum black; elytra coarsely punctate at base, apical third nearly impunctate, black, a red basal band, broader at middle, extends along the sides, and behind the middle is a triangular red space not reaching the suture, umbone black, a very small black spot on each side of the suture behind the posterior edge of the red band, the hind edge of the triangular spot bordered with black; beneath black. The four thoracic spots seen in the other species are wanting in this."

[This species has not been seen, and the above description is an abbreviation of the original.] "Ham."

**T. tetraophthalmus** Forst, 1771 (*Cerambyx*), Cent. Ins. p. 41; *Lamia tornator* Fab., Ent. Syst. 2, 287; *Tetraopes tornator* Schon., Syn. Ins. iii, 401; Say, Bost. Jour. i, 96; Lec., ed. ii, 665.
Length 9-14 mm. = .36-.56 inch. *Habitat.*—Canada, Vermont, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Michigan, Wisconsin, Illinois, Iowa, Nebraska, Kansas, Mexico, Louisiana, South Carolina.

[Black, head, thorax and elytra red; thorax with four discal spots, a blotch at the anterior angles and the basal margin, black; scutellum black; elytra with humeral umbone and three spots on each, black; these spots are usually constant, the first round and subsutural, the second an oblong discal space, the third also discal and roundish.] "Ham."

**T. collaris** Horn, Tr. Am. Ent. Soc. vii, 49.
Length 12.5 mm. = .50 inch. *Habitat.*—Colorado, New Mexico.

[Black, head, thorax and elytra red; thorax and elytra with the usual black spots; the thoracic umbone is suddenly elevated and its surface opaque; anterior and middle femora brown.] "Ham."

**T. femoratus** Lec., 1847, Jour. Ac. Nat. Sci. ser. 2, i, 93; l. c. ii, 157; var. *basalis* Lec., 1852, l. c. p. 157; var. *oregonensis* Lec., 1854, Proc. Ac. Nat. Sci. Phil. 1869, p. 81.
Length 12-16 mm. = .48-.64 inch. *Habitat.*—Illinois, Iowa, Nebraska, Kansas, Colorado, Texas, Arizona, California, Oregon, Washington, Montana.

[The foregoing is the distribution of the species; following Dr. Horn the varieties may be separated thus:

Var. FEMORATUS.—*Scape of antennæ black, femora red,* thorax quadrimaculate, elytra with umbone and three black spots on each side.

Var. MANCUS.—*Scape reddish, femora dark,* thorax quadrimaculate, umbone of elytra and one spot at middle on each side black, occurs in California and Nevada.

Var. BASALIS.—*Scape red, femora red,* thorax quadrimaculate, umbone and two spots on the elytra black, generally distributed.

Var. OREGONENSIS.—*Scape, femora, and anterior tibiæ red,* thorax quadrimaculate, umbone and three spots on each elytron black; these spots are very small and one or all are frequently absent. Occurs in Oregon, Washington and Arizona.

The foregoing is the definition of the aggregation of individuals which have received names, but besides there is a mass of others varying in the color of the limbs and in the number and size of the elytral spots in every conceivable way, as remarked by Dr. Horn, the antennæ likewise sometimes losing their usual annulation.] "Ham."

**T. quadrimaculatus** Hald., 1847, Tr. Am. Phil. Soc. x, 53; Lec., Agass. Lake Superior, p. 234; Jour. Ac. Nat. Sci. ser. 2, ii, 157; var. *texanus* Horn, Tr. Am. Ent. Soc. vii, 49.
Length 10-12 mm. = .40-.48 inch. *Habitat.*—Michigan, Lake Superior, Kansas, Texas, Oregon.

[Thorax quadrimaculate, elytra with umbone, and a posterior spot each side black; an example from Oregon has the scape of the antennæ red. The var. *texanus* is larger and frequently has a black spot on the elytra behind the scutellum close to the suture.] "Ham."

**T. canescens** Lec., 1852, Jour. Ac. Nat. Sci. ser. 2, ii, 157; *annulatus* Lec., 1847, l. c. ser. i, 93: l. c. ser. 2, ii, 157.

Length 9-14 mm. = .36-.56 inch. *Habitat.*—Kansas, Texas, New Mexico.

[The ground color of this species is very pale red, the thorax is quadrimaculate, the umbone and two spots on the elytra are black, one or both sometimes wanting; the pubescence is longer and denser than in any of the other species. *Annulatus* is the older name, but synonymy was made by the author himself for reasons not stated, but probably on account of the name being preoccupied.] "Ham."

## AMPHIONYCHA LeConte.

[The two species of this genus in our fauna may be thus separated:

Sides of elytra rounded.....**flammata.**
Sides of elytra vertical.....**amœna.**

**A. flammata** Newm., 1840 (*Saperda*), Entom. p. 13: Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 154; *marginata* ‡ Fab., Hald., Pr. Am. Phil. Soc. iv, 373; *ardens* Lec., 1849, Coleop. Kansas, p. 22.

Length 6-9.5 mm. = .24-.38 inch. *Habitat.*—New York, New Jersey, Pennsylvania, North Carolina, Florida, Texas, Kansas, Nebraska.

Black, hispid with fine erect black hairs, two oblique lines on the head, a stripe on each side of the thorax and the margins of the elytra nearly to apex yellow. Var. *ardens* is more hispid, more coarsely punctured, with the yellow of the margin extending to the middle of the disc. The antennæ are hispid from base and annulate from the fourth joint.] "Ham."

[**A. amœna** n. sp.—Length 4.5 mm. = .18 inch.

Elongate, shining black, antennæ shorter than the body, with long flying hairs, annulate at the incisures, scape and third joint subequal, fourth much shorter, outer joints gradually shorter. Head wider than long, short, a little retracted, front convex, with an exceedingly fine median line, not impressed between the antennæ, surface white, and with the thorax clothed densely with extremely fine short white pubescence. Thorax a little wider than long, cylindrical, a fuscous spot near margin behind each eye, at base each side of middle two large denuded triangular spots black. Elytra parallel till near apex, then suddenly obtusely rounded, disc flat, limited each side by a sharp ridge (humeral carina) parallel with the suture, sides deep, vertical, divided into two broad striæ by a subhumeral carina, internal (upper) with two rows of close-set round punctures, punctuation of the outer (lower) which is the wider confused, marginal stria very narrow, impunctate, obliterated in front; disc moderately finely punctured in rows, which are confused near the suture, each puncture bearing a very fine semi-erect black hair; underside with sparse exceedingly fine short pubescence, alutaceous, shining; first joint of hind tarsi scarcely longer than the second.

This is a pretty little species with white head and thorax spotted with black, and shining black elytra. The vertical and striate sides

of the elytra are characters not known to me to exist in any other species of the Cerambycidæ, and to some may suggest a new genus which may be named *Cathetopteron;* should the suggestion materialize, the foregoing characters will be sufficiently descriptive. The unique type was taken near Brownsville, Texas, by Mr. C. H. T. Townsend, and through the courtesy of Mr. L. O. Howard, Honorary Curator of the National Museum at Washington, its description has been permitted.] "Ham."

### Tribe XVI. Methiini.

Antennæ with second joint distinct.
First joint of antennæ with a small apical spine, front larger and more vertical, eyes more separated.....**Idœmea.**
First joint of antennæ with a stout spine, front short, eyes approximate. **Styloxus.**
Antennæ with second joint obsolete (therefore apparently 10-jointed).
Eyes emarginate.....**Methia.**
Eyes divided.....**Dysphaga.**

### IDŒMEA Horn.

**I. fulleri** Horn, 1880, Trans. Am. Ent. Soc. viii, p. 138, pl. ii, fig. 10.
Length 16.5 = .66 inch. *Habitat.*—Texas.

"Brownish testaceous, elongate, subcylindrical, sparsely clothed with pale brownish pubescence. Thorax cylindrical, slightly dilated at middle, one-fourth longer than wide, a slight oblique impression on each side near the base, vague traces of three smooth discal lines, surface coarsely punctured. Elytra wider than the thorax, coarsely punctured, gradually narrowed to apex, apices separately rounded. Body beneath and legs piceous, femora paler at base" (original description).

### STYLOXUS LeConte.

**S. lucanus** Lec., 1873, new species of Cerambycidæ (S. M. C. No. 264), p. 240.
Length 8.5 mm. = .34 inch. *Habitat.*—Cape San Lucas, Lower California.

["Brown, with grayish hairs, prothorax rugosely punctured, a small callus behind the middle; elytra pubescent, punctured, not covering the abdomen, rounded at apex" (LeConte's description. Tr.).

In this genus the eyes are very large and nearly contiguous on the vertex; the scape of the antennæ is spinose on the inner side; the thorax cylindrical and one-half longer than wide; the elytra three-fourths as long as the abdomen.] "Ham."

### METHIA Newman.

**M. pusilla** Newm., 1841, Ent. p. 18; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 144.
Length 5–9 mm. = .20–.36 inches. *Habitat.*—Florida.

[Piceo-fuscous; antennæ, legs and a broad space on the middle of the elytra, palish; eyes large, coarse, closely approximate on the

vertex; antennæ hispid, 10-jointed, joints 2–9 subequal; thorax longer than wide, deeply constricted at apex and base; disc uneven, not tuberculate; elytra three-fourths as long as abdomen, an elevation at base on each side of scutellum, closely and finely punctured; two very fine lines from humeral and scutellar umbone uniting before apex; the color is variable by expansion or contraction of the pale or brown.] "Ham."

[**M. punctata** Lec., 1873, new species of Cerambycidæ (S. M. C. No. 264), p. 240; *Methia pusilla* ‡ Chev., 1862, Coleop. Cuba (Ann. Ent. Soc. France), p. 256.

Length 7-10 mm. = .28–.40 inch. *Habitat.*—San Domingo, Cuba.

As this species bears a great resemblance to *pusilla*, and its occurrence in southern Florida probable, the principal differential characters are reproduced so that it may be recognized when found. The sides of the thorax are scarcely dilated; there is no apical, and the basal constriction is less deep; the elytra are comparatively shorter, and the coloration is inconstant.] "Ham."

## DYSPHAGA LeConte.

[Synopsis by Dr. Geo. H. Horn, Coleop. Baja Calif. (Proc. Cal. Acad. Sci. v, 247. All the species are rare.

Head and thorax piceous black.
  Thorax distinctly punctate, elytra not costulate.....**tenuipes.**
  Thorax smoother, bicallous at base.....**lævis.**
Head and thorax reddish yellow, elytra piceous and distinctly bicostulate. **bicolor.**
Pale yellowish testaceous, elytra bicostulate.....**debilis.**]

**D. tenuipes** Hald., 1846 (*Molorchus*), Pr. Ac. Nat. Sci. iii, 126; Proc. Am. Phil. Soc. iv, 374; Lec., Jour. Ac. Nat. Sci. ser. 2, ii, 143; *Tessaropa ventralis* Hald. ♀, Proc. Am. Phil. Soc. iv, 374.

Length 6–6.5 mm. = .24–.26 inch. *Habitat.*—New York, New Jersey, Pennsylvania.

[Black, clothed thinly with cinereous pubescence, thorax cylindrical and elongate, with ocellate punctures; elytra scabrous about half the length of the abdomen, pale at base, underside brownish ♂, yellowish ♀. Breeds in dead hickory twigs. The rarity of the *Dysphaga* may be apparent only, as their great resemblance to the common *Molorchus* may deceive collectors.] "Ham."

**D. lævis** Lec., 1873, New Species (S. M. C. No. 264), p. 240.

Length 7 mm. = .28 inch. *Habitat.*—Illinois.

[Differs from *tenuipes* by the characters in the table, and by the rather longer elytra narrowed and dehiscent behind the middle, and by being piceous.] "Ham."

**D. bicolor** Horn, 1885, Tr. Am. Ent. Soc. xii, 196.
Length 7.5 mm. = .30 inch. *Habitat.*—Texas.

The characters in the table will distinguish this species when found.

**D. debilis** Horn, 1895, Coleop. Baja Calif. (Proc. Cal. Acad. Sci. 2d ser. v, 246.
Length 4.5 mm. = .18 inch. *Habitat.*—Lower California (San Jose del Cabo).

This species can likewise be known by the table.

[*Polyopsia analis* Hald., 1845, Tr. Am. Phil. Soc. x, 57, was placed in *Adetus* Lec., Jour. Ac. Nat. Sci. ser. 2d, ii, 161, of which *Agennopsis* Thoms. is a synonym. It has been discovered that the type was from Brazil and not from Pennsylvania, Lec. Proc. Acad. Nat. Sci. 1873, p. 336.] "Ham."

(*Here Mr. Leng's work ends.*)

While the Synopsis of the Cerambycidæ has been going through the press some changes in synonymy have been made, some unknown species introduced and others described. To complete the work these must be briefly noticed.

**Ergates neomexicanus** Casey, 1890, An. N. Y. Acad. Sci. v, 490.

This is synonymous with SPICULATUS, being a description of a well-established individual variation.

**Mallodon molarium** Bates, 1879, Biolog. Am. Cent., Coleop. vol. v, 9, pl. 1, figs. 10 and 11. *Habitat.*—Lower California, Mexico, Panama, Nicaragua.

[Resembles our other species, but has the upper edge of the mandibles elevated in a tubercle.] "Horn."

*Prionus debilis* Casey, 1891, An. N. Y. Acad. Sci. vi, 21. This is a synonym of IMBRICORNIS, being a description of a small and well-known race of that species.

*Tragosoma harrisii* is T. DEPSARIUM Linn. as shown by ample comparisons (see Can. Ent. xxiv, 296). Recently Mr. Klages compared examples taken in the higher mountains of Colorado with his European and finds them identical, but varying much from the Pennsylvania form.

**Tragosoma spiculum** Casey, 1890, An. N. Y. Acad. Sci. v, 492.

This is described from an extreme individual variation of DEPSARIUM with which it must be united.

**Tragosoma pilosicornis** Casey, 1890, l. c. p. 492.
Length 24.6 mm. = .98 inch. *Habitat.*—? California.

Separated, according to Mr. Casey, from *depsarium* by its rather

densely pubescent antennæ, feeble elytral sculpture, form of the sutural spines, and smooth, polished and impunctate hypomera.

TETROPIUM.—Three species have recently been added to the previous two by Capt. Thomas L. Casey, and a synoptic table of all the species presented, which is here reproduced from Ann. N. Y. Acad. Sci. vi, 22.

Elytra wider than the prothorax; third antennal joint in the male much longer than the second.
  Third antennal joint (female) pyriform, unusually short, scarcely twice as long as wide; pronotum very sparsely punctate, except laterally; elytra generally pale.....**cinnamopterum.**
  Third antennal joint (female) much more elongate, always distinctly more than twice as long as wide; pronotum very densely punctate.
    Pronotum with a narrow and abruptly limited median impunctate area toward base, which is subcarinate; elytra generally pale. **parallelum.**
    Pronotum without a median impunctate area, except narrowly and vaguely toward base; elytra usually concolorous.
      Sides of the prothorax broadly rounded; pygidium evenly parabolic. **schwarzianum.**
      Sides of the prothorax vaguely subangulate in the middle, the punctuation very fine, extremely dense; pygidium triangular with the apex narrowly subtruncate.....**velutinum.**
Elytra not wider than the prothorax; second antennal joint of the male but slightly shorter than the third, the latter equal in length to the fourth. **parvulum.**

**T. parallelum** Casey, 1891, l. c. 23.
Length 12–14 mm. = .48–.56 inch. *Habitat.*—Colorado, New Mexico.
Black, elytra uniform red-brown, pubescence short, very dense.

**T. schwarzianum** Casey, 1891, l. c. p. 24.
Length 14 mm. = .56 inch.; width .18 inch. *Habitat.*—Michigan (Marquette).
Piceous black, pubescence short and dense; resembles *velutinum.*

**T. parvulum** Casey, 1891, l. c. p. 24.
Length 8 mm. = .32 inch.; width .88 inch. *Habitat.*—Indiana.
Resembles *cinnamopterum*, but has shorter legs, and the antennæ are not appendiculate.

More detailed descriptions than here given would cause confusion; none of Mr. Casey's types have been seen; the species as they now stand seem uncomfortably close, and there are some individuals which, by a strict interpretation, cannot be assigned to any of them.

*Hylotrupes litigiosus* Casey, 1891, l. c. p. 25, is a description of a long-known variety of LIGNEUS occurring on the Pacific coast.

*Phymatodes thoracicus* Muls. is a synonym of LIVIDUS Rossi.

**Phymatodes obliquus** Casey, 1891. An. N. Y. Acad. Sci. vi, 26.
Length 7.2-7.6 mm. = .288-.304 inch. *Habitat.*—California (Santa Clara Co.).

According to Mr. Casey this species is allied to *varius*, from which it differs chiefly by the longer antennæ, finer, sparser punctuation of the pronotum, denser punctures of the elytra, and much more oblique posterior fascia.

**Phymatodes juglandis** Leng, 1890. Ent. Amer. vi, 214.
Length 4.5-6.5 mm. = .18-.26 inch. *Habitat.*—California (Los Angeles).

Differs from *decussatus* by the more coarsely punctured elytra and the more oblique and angulate anterior fascia.

*Malacopterus vittatus* Lec. = LINEATUS Guer.

HYPEXILIS PALLIDA Horn and GRACILIA OBLIQUATA Horn (see Ent. Amer. vi, 213).

## CHROTOMA Casey.

This genus is founded on a single female example, and according to Mr. Casey only differs from *Brothylus* and *Osmidius* by the peculiar elongate subparallel form of the last joint of both palpi, but there is not sufficient data given to define its exact position in the table of the *Cerambycini*.

**C. dunniana** Casey, 1891. Proc. N. Y. Acad. Sci. vi, 27.
Length 16.5 mm. = .66 inch.; width .17 inch. *Habitat.*—Texas (El Paso).

Parallel, convex, piceous black throughout; thorax with five denuded callous spots on the disc; scutellum acutely triangular; elytra with a marginal and discal pale rufo-testaceous vitta nearly concealed by the dense vestiture, which is coarse recumbent and grayish white, with numerous small denuded spots and with an acute sutural spine (abstract from Casey's description).

**Eburia conspersa** Horn, 1894, Coleop. Baja Cal. (Pr. Cal. Ac. Sci. ser. 2, iv, 399).
Length 17 mm. = .67 inch. *Habitat.*—Lower California (San Jose del Cabo).

This species, according to the describer, has more the habitus of an *Elaphidion* than of an *Eburia*. Pale piceo-testaceous, thorax transversely quadrate, with a smooth median line and three facets on each side; elytra rugulose, with foveiform punctures, an ivory spot at base, two behind middle, tip of elytra rounded and with a sutural spine; femora not spinose.

**Elaphidion parallelum** Newm. = VILLOSUM Fab.

**Elaphidion arizoniense** Casey, 1891. An. N. Y. Acad. Sci. vi, 28.
Length 21-23 mm. = .84-.90 inch. *Habitat.*—Arizona.

Described from two male examples as of the form of *irroratum*,

castaneous throughout, sparsely marmorate on the thorax and elytra with denser spots of pale yellow; antennæ longer than the body, joints 3–5 strongly spinose, 8–11 carinate; thorax with a median and two basal callosities; elytra truncate, the outer spine obtuse, the inner more acute; femora not spinose, posterior tibiæ carinate. In the table this may be placed next *irroratum*.

**Elaphidion levettei** Casey, l. c. p. 29.
Length 18 mm. = .72 inch. *Habitat.*—Arizona.

Described from a single mutilated male as of the form and size of *pubescens*, next to which it may be placed in the table. Elongate, slender, parallel, dark rufo-castaneous, shining, pubescence silvery white, uniform on thorax and scutellum, but forming on each elytron four vittæ; antennæ wanting; thorax longer than wide, densely coarsely punctured on the disc, rufous towards the sides; elytra coarsely sparsely punctured at base, gradually finer to apex, truncate, bispinose; femora not spinose.

The following species has the four posterior femora obtusely unispinose at tip and may follow *mucronatum* in the table.

**Elaphidion mutatum** Gahan, 1890, Ann. and Mag. Nat. Hist. ser. 6, vol. vi, 32.
*E. tomentosum* ♀ Chev., 1862, Ann. Soc. Ent. France, ser. 4, ii, 260.
Length 16–20.5 mm. = .64–.80 inch. *Habitat.*—Cuba, Florida (Key West).

"Castaneous, covered with dense gray pubescence, disc of thorax with five tubercles, the median cariniform, the posterior two more or less obsolete; elytra densely punctate at base, punctuation behind middle obsolescent, each with the humerus and a sub-denuded dorsal spot near the middle castaneous and bispinose at apex; antennæ with joints 3 and 4 unispinose, 5–10 bispinose." [T. R.]

"Under the name *E. tomentosum*, Chevrolat included two very distinct species; the females which he has described are the females of the present species, the male of which I saw in the possession of Dr. Horn when here on a visit to England. Two female examples from St. Domingo, which are undoubtedly the females of *E. tomentosum*, are in the British Museum, and, except in the much shorter antennæ, present no differences of importance from the male. Like it they have the prosternum truncated and vertical behind. In *E. mutatum* the prosternum is feebly arched and almost flattened behind * * *. The spines at the apices of the joints of the antennæ do not stop with the seventh joint as Chevrolat's description seems to imply, but gradually becoming smaller, are met with up to the tenth

joint. Dr. Horn's male example from Florida differs from the female only in having slightly longer and slenderer antennæ, and in having the apex of the last ventral segment pointed in the middle and sinuated towards the sides, while in the female it is rather abruptly rounded. *E. tomentosum* bears a very strong resemblance to *E. mucronotum* Say, but may be distinguished by the much less close punctuation of the elytra and sides of the prothorax" ("Gahan").

ELAPHIDION CINEREUM Oliv. and E. LANATUM Chev. were not known in our fauna when Mr. Leng published his table of *Elaphidion*, but he has introduced them in a supplementary way (Ent. Amer. vi, 214). The length of *lanatum* is 15.5 mm. = .62 inch., and not as given by Mr. Leng. In both the femora are unarmed.

*Rhopalophora meeskei* Casey, 1891, An. N. Y. Acad. Sci. vi, 30, is a scarcely defined geographical race of LONGIPES (Can. Ent. xxiv, 159).

**Rhopalophora bicincta** Horn, 1895, Proc. Cal. Acad. Sci. ser. 2, v, 245.
Length 5 mm. = .20 inch. *Habitat.*—Lower California (San Jose del Cabo).

This is described from the female as black, rather dull, elytra with a basal and postmedian narrow band of silvery white pubescence; antennæ yellow, not longer than the body; thorax as in *R. longipes;* elytra parallel, scarcely wider than the thorax, apices 3 or 4 dentate, surface closely cribrate-punctate; beneath black, with patches of silvery white pubescence; legs piceo-testaceous, tibiæ paler. This species is placed in this genus for the present, but the discovery of the male may suggest a new generic name.

## RHINOTROGIDES Lacordaire (Tribe VI, *ss.*).

Distinct from RHOPALOPHORINI by the anterior coxal cavities closed behind; it is represented in our fauna by one species.

**Acyphoderes delicatus** Horn, 1894, Coleop. Baja Cal. (Proc. Cal. Acad. Sci. ser. 2, iv, 400).
Length 11 mm. = .44 inch. *Habitat.*—Lower California (El Taste).

The characters given are from the author's description.

Slender, head and antennæ yellowish, the latter half the length of the body, stouter externally, scape coarsely punctate, third joint nearly as long as the next three; thorax, length and breadth equal, wider at middle, black beneath and densely punctured, base and apex bordered with black, disc reddish brown, convex, densely punctate, a vague oblique umbone on each side of a feeble, smooth, median line; elytra pale brownish testaceous, yellowish white along base, subulate; abdomen pale piceo-testaceous; legs rufo-testaceous, femora and basal half of tibiæ yellowish.

*Ancylocera brevicornis* Casey, 1893, An. N. Y. Acad. Sci. vii, 585, is the female of ELYTROLEPTUS DIVISUS Lec.

**Tragidion auripenne** Casey, An. N. Y. Acad. Sci. vii, 586.

Length 14-20 mm. = .56-.80 inch. *Habitat.*—Arizona, southwestern Utah.

Described by the author as parallel, convex, black, the elytra bright golden-yellow, except at basal margin, pubescence recumbent assuming the color of the surface; antennæ slender, one-half longer than the body; thorax wider than long, acutely tuberculate on the sides behind the middle, disc with five tubercles; elytra each with five strong narrow ridges, the fourth joining the fifth before middle; legs slender, hind tibiæ somewhat dilated.

Mr. Casey regards *fulvipenne* Say as a species, but whatever view may be entertained will not affect the following table by Mr. Casey.

Third joint of the hind tarsus not longer, but seldom visibly wider than the second; elytra corrugated.

Antennæ more or less pale, the swollen apices of the pale joints black and abruptly more densely pubescent.

Antennæ entirely black toward apex; elytra strongly narrowed from base to apex; large species, the black hairs of the pronotum and legs with a strong cobalt-blue reflection ..... **annulatum.**

Antennæ pale throughout, the apices of all the joints black; elytra parallel; size smaller, black; the hairs without blue reflection; hind tibiæ moderately dilated and compressed ..... **auripenne.**

Antennæ black throughout; apices of the joints feebly swollen, but not more densely pubescent.

Third joint of the hind tarsus scarcely shorter than the second; posterior tibiæ not distinctly modified; elytra varying from black with a small fulvous spot behind the humeri to completely fulvous, except at the basal margin ..... **coquus.**

Third joint small, very much shorter than the second; posterior tibiæ broader, strongly compressed, elytra fulvous throughout, except at base. **fulvipenne.**

Third joint of hind tarsus distinctly longer and sometimes wider than the second; elytra not corrugated, parallel, each with three feeble and minutely costuliform lines; pronotal punctures in the male minute and dense, but becoming abruptly coarse in an apical band, the posterior transverse margin of which is multisinuate: in the female minute and dense throughout ..... **armatum.**

**Batyle cylindrella** Casey, 1893, An. N. Y. Acad. Sci. vii, 587.

Length 9.5 mm. = .38 inch. *Habitat.*—Texas (El Paso).

Described as bright red throughout, except the post-sterna, part of the tarsus, the apical part of the antennæ and tip of hind femora dark; differing from *suturalis* by its more elongate form, shorter and coarser pubescence, which is pale and not black, less punctate head and longer legs.

**Oxoplus coccineus** Casey, 1893, An. N. Y. Acad. Sci. vii, 588.
Length 19-20 mm. = .75-.80 inch. *Habitat.*—Utah (southwestern).

Described from three males as bright scarlet except the head, antennæ, entire under surface between the front and hind coxæ, apical and basal bead of the thorax, scutellum, basal margin of the elytra and a common sutural dash in apical half, black; this dash in the female becomes very broad, extending to the middle, but not attaining the margin, except near tip.

This may be placed in the table next *corallinus*, examples of which, in my collection, are uncomfortably close to it as described.

**Crossidius blandi** Casey, 1893, An. N. Y. Acad. Sci. vii, 589.
Length 7.7-9.5 mm. = .30-.38 inch. *Habitat.*—Southwestern Utah.

This species may follow *discoideus*, to which it is closely allied in the table heretofore given. It is represented as differing from *discoideus* in its smaller size, narrower form, sparse punctuation, especially the thoracic, the absence of the two subapical black spots on the thorax, and the rounded and not truncate apices of the elytra.

The following species belong to the group of *Crossidius* with the thorax subtuberculate:

**Crossidius longipennis** Casey, 1891, An. N. Y. Acad. Sci. vi, 31.
Length 15-19 mm. = .60-.75 inch. *Habitat.*—New Mexico.

Described from four examples, and stated to be related to *intermedius* but larger, differing also by the punctuation finer and denser, the black legs and antennæ, and the truncate and angulate elytral apices.

**Crossidius crassipes** Casey, 1891. l. c. p. 32.
Length 14 mm. = .56 inch. *Habitat.*—Washington.

Described from a single male example as intermediate between *punctatus* and *intermedius*, having the black legs and antennæ of the former and the long slender antennæ of the latter, and differing from *intermedius* in the very long posterior tarsi, in which the second joint is nearly one-half longer than wide.

**Crossidius nitidicollis** Casey, 1891. An. N. Y. Acad. Sci. vi, 33.
Length 10.5-12.5 mm. = .50-.60 inch. *Habitat.*—Arizona (Tucson).

Described as allied to *pulchellus*, but differing in the larger and longer thorax, with the extremely slender and acute lateral prolongation of the basal angles more conspicuous; and by the characters in the synoptic table of the species in the group with rounded and semituberculate sides which is here reproduced.

Prothorax more or less strongly transverse, very densely, confluently punctured and densely pilose.

Antennæ of the male rather short, never much longer than the body, those of the female very short and stout, with the joints scarcely more than twice as long as wide.

Elytral punctuation very coarse, becoming finer towards apex, the punctures always distinctly separated.....**punctatus.**

Elytral punctuation finer, becoming extremely dense toward apex. **testaceus.**

Antennæ of the male very long and slender, much longer than the body, those of the female moderate in length, slender, with the joints three or four times as long as wide.

Antennæ and legs pale; posterior tarsi short and slender; elytral punctures coarse, always distinctly separated.....**intermedius.**

Antennæ and legs black, or piceous black; posterior tarsi longer and much stouter.

Elytral punctures fine and very dense, coarser toward base. **longipennis.**

Elytral punctures very coarse, nearly as in *punctatus*, but denser. **crassipes.**

Prothorax much less transverse, coarsely, deeply punctate and shining, the punctures all distinctly separated.

Antennæ of the male much longer than the body.

Elytra rather finely and very densely punctate, the elytral base and suture throughout black.....**hirtipes.**

Elytra very coarsely, sparsely punctate, with a narrow fusiform black area at the suture scarcely ever extending as far as basal fourth. **nitidicollis.**

Antennæ of the male much shorter, never notably longer than the body; elytral punctures very coarse toward base, the disc with a broad black sutural area, which is usually angulate anteriorly, sometimes attaining the base.....**pulchellus.**

*Sphænothecus rubens* Casey, 1891, An. N. Y. Acad. Sci. vi, 34. This is a variety of SUTURALIS, in which the punctuation at the sides of the thorax and elytra becomes very fine and dense, but in many individuals this and *suturalis*, which is very variable in the coarseness or fineness and density of its punctuation, approximate. There are no primary structural characters by which the forms can be separated, and none of the secondary, as color or length of the antennæ are permanent. Both forms are abundant in southwestern Texas, New Mexico and Arizona.

**Sphænothecus basalis** Horn, 1894, Coleop. Baja Calif. (Proc. Cal. Acad. Sci. ser. 2, iv, 401).

Length 12-14 mm. = .48-.56 inch. *Habitat.*—Lower California.

Described as piceous black, moderately shining, a very small hair in each puncture of the dorsal surface, the base of elytra and femora

red, tibiæ and tarsi black, condiles of hind femora dentiform; thorax oval, narrower in front, disc convex, surface with coarse transverse punctures, median line smoother; elytra coarsely, irregularly punctate; apices acutely rounded, a small spine at the suture, a larger spine externally.

**Stenosphenus longulus** Casey, 1891, An. N. Y. Acad. Sci. vi, 34.
Length 10 mm. = .40 inch. *Habitat.*—Texas.

This species, described from a single male, is stated to differ from *lepidus* in having the pronotum in front of the coxæ strongly depressed and coarsely densely punctato-rugulose; in *lepidus* this space is divided by a polished longitudinal elevation, thus forming two depressed areas.

**Xylotrechus gemellus** Casey, 1893, An. N. Y. Acad. Sci. vii, 590.
Length 14-15 mm. = .54-.60 inch. *Habitat.*—Indiana.

Described from two examples and represented as differing from *undulatus* chiefly by the coarser sculpture of the pronotum, suffused pale pubescence extending across the base of the elytra and less prominent frontal carina; the transverse bands different in form, being wider and posteriorly arcuate at the point where, in *undulatus*, they are anteriorly angulate.

The individuals of *undulatus* vary greatly in coarseness or fineness of sculpture, in pubescence, and in distinctness of the elytral bands, and none of the differences mentioned by Mr. Casey seem of any value, unless it be the last mentioned.

*Cyrtophorus insinuans* Casey, 1893, An. N. Y. Acad. Sci. vii, 590. This is the male of *Microclytus gazellula.* The description was made from a unique taken in Ontario, Canada, with the statement that it only differed from *Microclytus gazellula* by having the third antennal joint briefly dentato-spinose.

The five males of that species before me all have rudimentay dentations at the apex of the third joint, and a little amplication of this most probably exists in Mr. Casey's unique.

The antennal characters of *Microclytus* in the "Classification" belong to the female; those of the male, then unknown, are the same as in *Cyrtophorus*, except in the less or non-development of the antennal spine.

**Euderces exilis** Casey, 1893, An. N. Y. Acad. Sci. vii. 591.
Length 4.25 mm. = .17 inch. *Habitat.*—Texas.

By description this species having a transverse ivory band on the elytra must be placed in the table with *reichei*, from which it differs by its greater robustness and spinose antennæ; and by the prothorax broader and more strongly and abruptly narrowed to base.

**Agallissus chamæropis** Horn, 1893, Tr. Am. Ent. Soc. xx, 138.
Length 19-21.5 mm. = .76-.85 inch. *Habitat.*—Florida (Biscayne Bay).

"Black, shining, elytra dull red with the suture piceous, thorax with four longitudinal lines of white pubescence. Head coarsely sparsely punctured at middle, eyes completely encircled with white recumbent pubescence, which extends along the sides of the front and crosses the edge of the clypeus. Thorax as wide as long, slightly narrowed in front, sides feebly arcuate, disc coarsely punctate, with four shallow longitudinal grooves extending from apex to base, the two inner grooves interrupted near the base, the grooves densely pitted with white recumbent pubescence; scutellum semicircular, black, glabrous. Elytra wider at base than the thorax, gradually arcuately narrowed to apex, apices rotundato-truncate, the sutural spine short, most distinct in the male, disc vaguely grooved on each side of suture, surface moderately coarsely, not closely punctate, each puncture with a short, semierect cinereous hair, color dull red, the suture gradually more widely piceous from the base, then more rapidly narrowing at the apical third. Body beneath black, shining, sparsely punctate; pro-pleuræ, sides of metasternum, outer edge of met-episterna, and a triangular spot at the sides of each ventral segment with white pubescence. Legs black, sparsely pubescent."

**Agallissus gratus** Hald., 1853 (*Cryptopleura*), Proc. Acad. Nat. Sci. Phil. vi, 363.

LeConte did not describe this species as he is credited with in all our lists.

NECYDALIS BARBARÆ Rivers, Ent. Amer. vi, 112, was described after Mr. Leng's synopsis of the genus was in press, but is included in a supplementary paper, l. c. p. 213.

**Toxotus lateralis** Casey, 1891. An. N. Y. Acad. Sci. vi, 37.
Length 13 mm. = .52 inch. *Habitat.*—California (near San Francisco).

Described as allied to *trivittatus*, but differing in its unusually long, stout and compressed antennæ; and as rather short and stout, moderately shining, with the body, legs and antennæ black, the abdomen rufo-testaceous, and the elytra with a pale narrow marginal vitta, which does not quite attain the apex.

**Anthophilax subvittatus** Casey, 1891. An. N. Y. Acad. Sci. vi, 37.
Length 9.3-11 mm. = .37-.44 inch. *Habitat.*—Colorado?

Described from five examples, probably males, and stated to be moderately robust, rather convex, piceous-black; legs and antennæ piceo-testaceous; elytra pale luteo-testaceous, with a broad common

sutural and narrow submarginal vitta of piceous-black, the vittæ generally feebly marked and sometimes evanescent; disc of thorax finely densely punctate and but feebly impressed along middle; disc of elytra coarsely and sparsely punctate toward base, gradually finer to apex and along suture.

**Acmæops varipes** Casey, 1891, An. N. Y. Acad. Sci. vi, 38.

Length 8-8.8 mm. = .32-.35 inch. *Habitat.*—California (Santa Cruz County).

Described from a single male as rather slender, strongly convex, shining, deep black; antennæ dark brown, the basal joint darker and blackish; anterior legs pale rufo-testaceous, the middle and hind femora slightly so near the coxæ; thorax coarsely densely punctate, with a narrow impunctate median line; disc of elytra coarsely not closely punctate, finer toward apex. Allied to *longicornis* and *basalis;* Mr. Casey, however, has not given characters by which it may be placed properly in the table.

STRANGALIA *montana* Casey, 1891, An. N. Y. Acad. Sci. vi, 40. This is synonymous with SEXNOTATA, which is quite variable in color of the legs and antennæ and in coarseness or fineness of the punctuation. The truncation of the female elytra at tip is relied on by Mr. Casey to separate it from *sexnotata*, but in a sufficiently large series, the tip will be seen to vary from acute to truncate, especially in Western examples.

**Leptura spuria** Lec. is the male of ACMÆOPS MILITARIS Lec.

**Leptura exigua** Newm. *saucia* Lec.

**L. nana** Newm. var. *hæmatites* Newm.

This synonymy was determined, by Dr. Geo. H. Horn, by comparison with Newman's types in the British Museum, Tr. Am. Ent. Soc. xv, 301.

**Leptura gaurotoides** Casey, 1893, An. N. Y. Acad. Sci. vii, 592.

Length 9.5 mm. = .38 inch. *Habitat.*--Utah (southwestern).

Described as broad nearly as in *Gaurotes*, convex, elytra feebly shining; body, legs and antennæ intense black; pubescence dark and inconspicuous; antennæ half the length of the body, stout, compact; prothorax of the outline of *instabilis;* scutellum broadly and transversely truncate; elytra strongly, evenly, not very densely punctate, tip rounded not truncate. To be placed in the table near *instabilis*.

**Leptura serpentina** Casey, 1891, An. N. Y. Acad. Sci. vi, 41.

This is a synonym of TRIBALTEATA Lec., which is variable in the form of the body, elytral ornamentation, and color of the antennæ.

**Leptura haldemani** Casey, 1891, An. N. Y. Acad. Sci. vi, 42.
Length 9-10.5 mm. = .36-.42 inch. *Habitat.*—New Mexico.

Described as slender and rather convex, the body intensely black; legs, antennæ and elytral humeri red; moderately shining; pubescence sparse and inconspicuous; antennæ (male) nearly as long as the body; thorax much longer than wide, like that of *sanguinea;* disc extremely densely punctate; elytra not coarsely nor densely punctate, narrowly truncate at tip. May be placed in the table near *sanguinea.*

**Leptura lacustris** Casey, 1891, An. N. Y. Acad. Sci. vi, 43.
Length 7.8-9 mm. (female); 9-11 mm. = .36-.44 inch. (male) = .31-.36 inch. *Habitat.*—Michigan (Marquette).

Described as having the body, legs and antennæ entirely black, the elytra pale brownish testaceous, sometimes feebly infuscate toward the apex; moderately shining; pubescence moderately long very short on the elytra. The males are larger than the females and the sexual differences throughout the body unusually well marked. Allied to *sanguinea* Lec., but differs in the much stouter male antennæ and in the truncation of the elytra being not broad and strait, but narrow, oblique and deeply sinuate, nearly as in *canadensis.*

## OPHISTOMIS Thoms.

This genus is only separable from *Leptura* by the head being prolonged into a beak. It is represented in our fauna by two species.

**O. lævicollis** Bates, 1880, Biol. Cent. Amer. Col. v, p. 39.
Length *Habitat.*—Arizona, Oaxaca to Panama.

**O. ventralis** Horn, 1894, Proc. Cal. Acad. Sci. ser. 2, iv, 401.
Length 11-12 mm. = .42-.47 inch. *Habitat.*—Southern California, Lower California (El Taste).

"Slender; head black, closely punctate; thorax red or black, conical, longer than wide at base, apex constricted, sides compressed behind the middle, disc very convex, very sparsely and finely punctate, hind angles not explanate. Elytra wider at base than the thorax, humeri prominent, sides obliquely narrowing, apex obliquely emarginate-truncate, the angles acute, disc coarsely and deeply not regularly punctate, punctures finer toward apex. Pro- and mesosternum black. Metasternum and abdomen red, very sparsely finely punctate, not pubescent. Legs black, the underside of hind femora at base usually red. The vestiture of the upperside consists of very short black hairs arising from the punctures. Allied to *rufiventris* Bates from Nicaragua, but differs in its almost smooth thorax." "Horn."

The synopsis of the Cerambycidæ, now brought to a close, was commenced in 1884, and published from time to time, in parts, as follows:

Bulletin of the Brooklyn Ent. Soc. vol. vii, pp. 7-11.—*Ergates* to *Orthosoma*.
" " " " " 57-64.—*Prionus* to *Criocephalus*.
" " " " " 64.—One plate with 11 figures.
" " " " " 95-101.—*Tetropium* to *Merium*.
" " " " " 112-119.—*Callidium* to *Stromatium*.
Entomologica Americana, vol. i, pp. 28-35.—*Gnaphalodes* to *Aneflus*.
" " 35.—Two plates, thirty-one figures.
" " 130-136.—*Romaleum* to *Curius*.
" " 136.—One plate, twenty figures.
" vol. ii, pp. 27-32.—*Obriini* to *Evadna*.
" " 60-63.—*Callichroma* to *Crioprosopus*.
" " 63.—Two plates, 28 figures.
" " 81-83.—*Tragidion* to *Amannus*.
" " 102-103.—*Batyle* to *Oxoplus*.
" " 118-120.—*Schizax* to *Perarthrus*.
" " 193-200.—*Ischnocnemis* to *Xylotrechus*.
" vol. iii, pp. 4-8.—*Xylotrechus* to *Clytanthus*.
" " 23-24.—*Clytanthus* to *Euderces*.
" " 44.--*Euderces*.
" vol. vi, pp. 9-13.—*Agallissus* to *Encyclops*.
" " 65-69.—*Rhagium* to *Tozotus*.
" " 97-98.—*Pachyta* to *Anthophilax*.
" " 104-110.—*Acmæops* to *Piodes*.
" " 156-160.—*Gaurotes* to *Typocerus*.
" " 185-200.—*Leptura*.
" " 213-215.—*Euryptera* and notes.

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## CONCLUDING NOTES.

**Cœnopœus niger** Horn, 1894, Coleop. Baja Cal. (Proc. Cal. Acad. Sci. ser. 2, iv, 402).

Length 17-19 mm. = .67-.75 inch. *Habitat.*—Lower California (Sierra El Chinche, at 2000 feet).

"Of the form of *palmeri*, but differing in the coarser and closer elytral punctuation, and in the absence of any ornamentation by pubescence either above or beneath."

"Black, shining, the pubescence excessively fine, short, black; antennæ black, joints three to seven annulate with white; front sparsely punctate; thorax broader than long, angulate at the middle, sides in front oblique, behind the angulation forming a cylindrical constriction, surface with coarse punctures along the apex and base, very few at middle; elytra coarsely, closely and deeply punctate, near the apex much smoother; body beneath extremely finely pubescent. Described from two females and have the last ventral slightly emarginate as in *palmeri*." Horn.

This species was accidentally omitted from its proper place.

*Acanthoderes wickhami.* This seems to be the species described by Dr. Horn under the name *Peritapnia fabra*, of which Mr. Leng was not cognizant till both were in press, who suggests that the latter genus might be placed among the Acanthoderini.

**Peritapnia nudicornis** Bates (*Tapeina?*), Biol. Cent. Am. vol. v. 421. Horn, Baja Cal. (Proc. Cal. Acad. Sci. ser. 2, vol. iv. 340 and 403).

Length . *Habitat.*—Lower California (Sierra El Chinche at 2000 feet); Mexico (Oaxaca).

This species is made the type of the genus by Dr. Horn, who separates the species thus:

"Piceous black, moderately shining, muricate punctures of elytra irregularly placed ..... **nudicornis.**

Brown, dull, more convex, muricate punctures regularly and evenly placed. **fabra.**

The coxæ are rather more widely separated in the former. In the males of both species the anterior femur is slightly angulate on the underside one-third from the base and with a small brush of short hairs. The females have a slight fovea in the last ventral segment, while that of the male is plain." Horn.

Systematists are undecided as to the true position of this genus as well as that of *Tapeina.*

*Lepiostylus parvus, argentatus* and *aculifer;* examples of these species have recently been seen, which were taken by Mrs. Slosson at Lake Worth, Florida, the latter species having the elytral tubercles pubescent, as in *argentatus.*

*Liopus alpha:* add to the synonymy *cinereus* Lec. l. c.

The Lamiinide division of our Cerambycidæ now contains 162 species in 54 genera. That of Europe including Caucasus and Russian Armenia, 254 species in 31 genera, nine of which occur in our fauna, namely: *Monohammus, Acanthoderes, Acanthocinus, Liopus, Hoplosia, Pogonocherus, Saperda, Tetrops* and *Obereu;* omitting *Acanthocinus* and *Hoplosia,* the same genera are common to Siberia, which contains 102 species in 25 genera, as the genera now stand.

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## CORRIGENDA.

Page 103, line 27, 29, 44 *read* Michthisomini, MICHTHISOMA, *Michthisoma.*
" 104, " 32, for Gen. *read* Captain.
" 106, " 41, for Acan. *read* Arcan.
" 108, " 27, for **Dorchas.** *read* **Dorcas.**
" 110, " 18, for **DORCHAS.** *read* **DORCAS.**
" 113, " 4, for synopsis *read* synopses.
" 113, " 13, for Lagochier. *read* Lagocheir.
" 134, " 36, for baswood *read* basswood.
" 142, " 26, for **APORTAX.** *read* **APORATAX.**
" 144, " 11, for *Melothia* read *Melothria.*
" 149, " 28, for *Cretægus* read *Cratægus.*

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# DESCRIPTIONS OF NEW PARASITIC HYMENOPTERA.

BY WILLIAM H. ASHMEAD.

(Paper No. 2.)

## Family SAPYGIDÆ.

### SAPYGA Latreille.

**Sapyga pelopœi** sp. n.

♂.—Length 8 mm. Black, confluently punctate, pubescent; a stripe behind eyes, space between base of antennæ, the lower part of the emargination of the eyes, clypeus, spot on each mandible, labrum, palpi, antennæ beneath, a spot on each anterior angle of pronotum, femora beneath and three tips, all tibiæ and tarsi, four small spots on first dorsal abdominal segment, two larger ones on the second, two very large confluent spots on third and fourth, two large spots but widely separated on the fifth, two still smaller spots on sixth and a large one at base of seventh segment, lemon-yellow; some yellow spots varying in size are also present along the sides of the venter. Wings hyaline, the stigma and veins dark brown; submarginal cells four, the first and fourth about equal, the second and third much shorter, the third slightly longer than the second.

*Hab.*—Toronto, Canada.

Described from a single specimen, bred by Mr. W. A. Williams, from the cells of *Pelopœus cementarius*. Evidently allied to *S. martini* Smith.

## Family MUTILLIDÆ.

The tribes and genera of our Mutillidæ may be recognized from the following tables:

### TABLE OF TRIBES.

Ocelli present in both sexes.
  Cubitus in hind wings originating from the apex of submedian cell or close to it; marginal cell of front wings long.....Tribe I. *Myrmosini*.
Ocelli present only in males, absent in females.
  Ocelli small or moderate, rarely large.
    Cubitus in hind wings originating far anterior to the apex of the submedian cell; marginal cell of front wings short; thorax in ♀ entire. Tribe II. *Mutillini*.
Ocelli very large.
  Cubitus in hind wings originating from the apex of the submedian cell or interstitial with the transverse median nervure; thorax in ♀ divided into two parts.....Tribe III. *Cyphotini*.

## Tribe I. *Myrmosini.*

### TABLE OF GENERA.

*FEMALES.*

Body rugose, the thorax divided into two parts.....**Myrmosa** Latr.
Body smooth, the thorax divided into three parts.....**Methoca** Latr.

*MALES.*

Apex of abdomen unarmed; front wings with four submarginal cells, the first recurrent nervure joining the second submarginal cell before its middle; cubitus of hind wing interstitial with the transverse median nervure.
**Myrmosa** Latr.

Apex of abdomen armed with a curved spine; front wings with only three submarginal cells by the obliteration of the first transverse cubital nervure the first and second submarginal cells therefore confluent; cubitus of hind wing not interstitial with the transverse median nervure.
**Methoca** Latr.

## Tribe II. *Mutillini.*

### TABLE OF GENERA.

*FEMALES.*

Eyes ovate.
Mandibles 3-dentate.....**Mutilla** Linn.
Mandibles 2-dentate.....**Smicromyrme** Thoms.*
Eyes round.
Mandibles falcate or nearly so, crossing each other at tips with a small tooth within some distance from apex .....**Sphærophthalma** Blake.

*MALES.*

Eyes reniform.
Mandibles 3-dentate..... **Mutilla** Linn.
Mandibles 2-dentate.....**Smicromyrme** Thoms.*
Eyes round.
Anterior wings with two submarginal and two discoidal cells, the marginal cell not truncate at tip.
Mandibles bidentate at tips.....**Pseudomethoca** Ashm. n. g.
Anterior wings with three submarginal and three discoidal cells, the marginal cell truncate at tip.
Ocelli small; mandibles long, falcate, crossing each other at tips, with a small tooth within some distance from apex...**Sphærophthalma** Blake.
Ocelli large; mandibles strongly curved, truncate and 3-dentate at apex.
**Photopsis** Blake.

## Tribe III. *Cyphotini.*

### TABLE OF GENERA.

*FEMALES.*

Middle tarsi with one spur.....**Brachycistes** Fox.
Middle tibiæ with two spurs.
Thorax divided into two parts, the abdomen with a long, slender petiole; mandibles bidentate.....**Cyphotes** Blake.

---

* To this genus belong most, if not all, our species now placed in the genus *Mutilla*.

*MALES.*

Apex of abdomen armed with a curved spine.
Middle tibiæ with one spur.....**Brachycistes** Blake.
Middle tibiæ with two spurs.....**Cyphotes** Blake.*

**PHOTOPSIS** Blake.

**Photopsis nanus** sp. n.

♂.—Length 3–4 mm. Very light brownish yellow; eyes round, black; the stemmaticum sometimes dusky, the ocelli pale, sometimes ringed with dusky at base; scape and legs, including coxæ, white or yellowish white. Body clothed with long, sparse, pale hairs, especially on abdomen and legs, less distinct on head and thorax. The scape of the antennæ is hardly as long as the pedicel and first two joints of flagellum united, the first flagellar joint only two-thirds the length of the second, the fourth and following joints a little shorter than the second, but still longer than the first. Wings hyaline, iridescent, the stigma and veins pale, the former tinged with yellow; the marginal cell is not longer than the stigma; two complete submarginal cells, the third indicated, however, by the presence of the third transverse cubital, the other nervures obliterated; the second submarginal cell is shorter than the first, the recurrent nervure joining it at its basal one-third.

*Hab.*—Tucson, Arizona.

Described from several specimens. Comes nearest, apparently, to *P. minutus* Blake, but is much smaller, paler in color, with a different wing venation. In *P. minutus* the radius originates nearer the base of the stigma than in *nanus*, while the recurrent nervure joins the second submarginal cell almost at its middle.

**PSEUDOMETHOCA** Ashm. n. g.

*Male.*—Apex of abdomen armed with two spines; anterior wings with two submarginal cells, nearly equal in length, the second slightly the larger, the recurrent nervure joins the second cell a little before its middle, marginal cell short, extending only half way to the apex of wing, the radius originating before the middle of the stigma and strongly curved from its origin to the margin of the wing; mesonotum without parapsidal furrows. Head subquadrate, as viewed from above, the hind angles acute; ocelli close together in a triangle; antennæ 13-jointed, filiform, inserted near the clypeus, rather widely separated at base, with a slight keel between, the scape as long as the pedicel and first two joints of flagellum united, the first joint of flagellum shorter than the second; maxillary palpi 6-, labial palpi 4-jointed; tibial spurs 1, 2, 2, the middle and posterior pairs rather long, straight and slender. Type, *Photopsis cressonii* Fox.

* To this genus belong *Photopsis albipes* Bl., *P. belfragei* Bl., *P. melaniceps* Bl., *P. attenuata* Bl. and two or three other species.

**Pseudomethoca cressonii** Fox.

♂.—Length 4 mm. Black, shining, clothed with sparse whitish hairs; mandibles, palpi, antennal tubercles, sutures of trochanters, knees of anterior and middle legs and their tarsi, the abdominal sutures 2 and 3 and the last segment with two spines, honey-yellow; anterior and middle femora *beneath*, more or less piceous. Head distinctly punctate; thorax with coarser reticulated punctures; metanotum reticulated. Wings subfuscous, the stigma and veins brown. Abdomen sparsely punctate, the punctures closer together toward apex of the segments, the segments 3 and 5 perfectly smooth, impunctured towards the base.

*Hab.*—Jacksonville, Fla.; New Jersey (Fox).

Described from a single specimen captured by myself.

## Family CYNIPIDÆ.

### Subfamily I. FIGITINÆ.

#### SARATHRUS Hartig.

**Sarathrus nasoni** sp. n.

♀.—Length 2 mm. Polished black; eyes bare; legs dark honey-yellow, the coxæ and femora, except tips, black; the posterior tibiæ more or less obfuscated behind; antennæ 13-jointed, entirely black, the scape and last joint of an equal length, and longer than any of the other joints, the scape clavate, the last joint oblong ovate; the first and second joints of the flagellum are about equal, but slenderer than the following joints, the flagellar joints 3-10 subequal, about twice as long as thick, the terminal joint is not quite twice as long as the penultimate. Wings hyaline, the veins reddish brown, the areolet incomplete, with only the second transverse cubital vein present; scutellum rugose, with two large polished foveæ at base, separated by a delicate carina; metathorax rugulose with two median carinæ, the latter bounded outwardly by a rather dense pubescence.

*Hab.*—Algonquin, Ill.

Described from one ♀ taken by Dr. Wm. A. Nason, Aug. 12, 1895.

#### FIGITODES Ashmead.

**Figitodes atricornis** sp. n.

♀.—Length 2.5 mm. Polished black; eyes pubescent: mandibles and palpi black; knees, tibiæ and tarsi dark honey-yellow; The sides of face, along the eyes, are microscopically shagreened; prothorax at sides, the mesopleura, except superiorly, and the metapleura are coarsely striated; antennæ 13-jointed, black, the last joint much stouter, but very little longer than the scape, twice as long as the penultimate joint; the first joint of the flagellum is a little longer than the second, the third a little shorter than the second, the joints beyond submoniliform, only a little longer than thick. Wings hyaline, bare, the marginal cell open along the fore margin and nearly as wide as long: mesonotum smooth, with two furrows; scutellum rugose posteriorly; ventral valve large triangular, the short abdominal segments 4-6 sparsely microscopically punctate, visible only with a high power lens, the seventh or terminal dorsal segment closely minutely punctate, except at base.

*Hab.*—Santa Fé, New Mex.

Described from one ♀ received from Prof. T. D. A. Cockerell, who captured it on *Alfalfa*.

### SOLENASPIS Ashmead.

**Solenaspis singularis** sp. n.

♀.—Length 2.5 mm. Black; antennæ, except scape, light brown, the terminal joint dusky; trochanters, knees, anterior and middle tibiæ and their tarsi, honey-yellow. The head in front is roughly shagreened, behind on occiput transversely rugulose; pronotum above and at sides longitudinally striated; mesopleura shagreened, superiorly smoother and delicately striated; mesonotum smooth, highly polished, with two deep, crenated parapsidal furrows; scutellum coarsely rugose, with two large deep foveæ at base and produced into a long spine at apex; metathorax coarely rugose; antennæ 13-jointed, long, extending to middle of abdomen, thickened at tips, the terminal joint being oblong, much thicker than the preceding and the longest joint; the first joint of flagellum is only two-thirds as long as the second, the following joints very gradually thickening and also gradually shortening. Wings hyaline, finely pubescent, the veins piceous or black, the outer vein of the areolet perpendicular and rather long, the cubitus visible as a delicate brownish streak. Abdomen not longer than the thorax, the petiole short, transverse, with several raised lines.

The ♂ agrees well with the ♀, except the antennæ are 14-jointed, filiform, longer than the body, the flagellum brown, dusky towards tip, the joints long, cylindrical, the first shorter than the second, not quite five times as long as thick, while the outer transverse cubital nervure is much shorter than in the ♀.

*Hab.*—Algonquin, Ill.

Described from one ♀ and five ♂ specimens received from Dr. Wm. A. Nason.

## Subfamily II. ONYCHIINÆ.

### ASPICERA Dahlbom.

**Aspicera utahensis** sp. n.

♀.—Length 3.1 mm. Black, pubescent; flagellum and legs rufous; mesopleura polished; first joint of flagellum distinctly longer than the second; scutellum rugose, with some raised lines and terminating in a spine; surface of thorax feebly shagreened, the usually carinæ present, but the surface between not reticulated from irregular raised lines; tegulæ black. Wings hyaline, the veins light brownish.

*Hab.*—Salt Lake, Utah.

Described from one ♀ taken by Mr. E. A. Schwarz.

This species is allied to *A. albihirta* Ashm., but is readily separated from it and other species by its smoother surface, and the relative length of the first and second flagellar joints.

## Subfamily III. ANACHARINÆ.

### XYLASPIS Hartig.

**Xylaspis flavipes** sp. n.

♂.—Length 2.3 mm. Black; antennæ, except scape at base, light brown; mandibles, palpi and legs, except the hind coxæ, yellow, the anterior and middle coxæ more or less dusky at base; first joint of flagellum about one-half longer than the second. Head smooth, polished; thorax finely rugulose, the collar at

sides rugose, the mesopleura polished only at the middle; the scutellum ends in a conical spine, is coarsely rugose, with two large foveæ at base. Wings hyaline, the veins light yellowish; petiole of abdomen about twice as long as thick, smooth, shining, except a few wrinkles at base.

*Hab.*—Great Falls, Md., and Arlington, Va.

Described from two ♂ specimens, the one from Maryland taken by Mr. E. A. Schwarz.

### AEGILIPS Haliday.

**Aegilips victoriæ** sp. n.

♀.—Length 1.9 mm. Polished black; sides of prothorax, the scutellum and the metathorax rugose; antennæ slightly thickened toward tips, ferruginous, the scape dusky at base above, the first joint of the flagellum distinctly longer than the second. Legs honey-yellow, except tips, black; the femora more or less obfuscated, the hind tibiæ and tarsi dusky; petiole very short, grooved.

*Hab.*—Victoria, V. I.

Described from one ♀ specimen taken by Mr. E. A. Schwarz, June 2, 1893.

### ANACHARIS Dalman.

**Anacharis mexicana** sp. n.

♀.—Length 3.1 mm. Polished black, the head and thorax above, including the scutellum, with a decided æneous tinge; pronotum at sides, mesopleura, except at middle, and metathorax rugose; antennæ, except scape and the legs, ferruginous. The first and second joints of the flagellum are about equal, the following to the last very gradually shortening and thickening, the last joint as long as the pedicel and first flagellar joint united; petiole of abdomen slender smooth, longer than the hind coxæ.

*Hab.*—Santa Fé, New Mex.

Described from one ♀ specimen taken by Prof. T. D. A. Cockerell, in August.

## Subfamily V. EUCŒLINÆ.

### GANASPIS Förster.

**Ganaspis diastrophi** sp. n.

♀.—Length 2 mm. Polished black; antennæ 13-jointed, rufous, uniformly thickened, the third joint alone being a little thinner than the others, the joints beyond elongate oval, finely fluted, slightly pubescent and about twice as long as thick. Thorax elevated, not longer than high, not compressed at sides, the scutellum rugose, the cup much elevated, broadly oval or nearly round, its margins pale, the disc flat, with a fovea posteriorly and a few punctures around the rim; anteriorly it is connected with the mesonotum by a sharp carina; pleura smooth, polished; metathorax very short, rugulose, with two delicate parallel carinæ down the centre. All coxæ and femora, except tips, black; trochanters, tips of femora and rest of legs, honey-yellow. The abdomen is about as long as the thorax, smooth, polished, with a slight pubescent girdle at base and abruptly truncate at tip. Wings hyaline, iridescent, ciliated, the veins yellowish; the

marginal cell is about as broad as long, the second abscissa of the radius slightly curved outwardly and but slightly longer than the first: there is a distinct submedian nervure connecting with and extending slightly beyond the basal nervure.

♂.—Length 1 mm. In structural and colorational detail the male agrees with the female very closely, except in its smaller size and the following differences: The antennæ are 15-jointed, black, all the joints but the third being round, or moniliform; the third joint is twice as long as thick, narrowed towards base, while the tibiæ are obscured or brownish.

*Hab.*—West Point, Neb.

Described from two specimens, one ♂ one ♀, received by the Department of Agriculture from Prof. L. Bruner and labeled "Reared from blackberry gall, *Diastrophus cuscutæformis* O. S.

### PIEZOBRIA Förster.

**Piezobria floridana** sp. n.

♀.—Length 1.2 mm. Polished black; antennæ 13-jointed, the two basal and the six enlarged terminal joints black, the intermediate joints brownish or yellowish, the last joint of club much the largest, globose: cup of scutellum broadly oval, nearly round, perfectly flat above, with a row of punctures surrounding the margin, the margin piceous. The legs are reddish brown or dark red, the femora more or less obfuscated. Wings hyaline, iridescent, pubescent and ciliated, the veins pale, only slightly tinged with yellow, the marginal cell all along the fore border and at base, as in genus *Aspicera*. Abdomen as long as the head and thorax united, black, highly polished, along the venter basally it is more or less piceous or brownish; the ovipositor protrudes slightly, but probably unnaturally.

*Hab.*—Archer, Fla.

Described from four specimens, collected by Mr. E. A. Schwarz, May 3, 1882.

## Subfamily VI. ALLOTRIINÆ.

### ALLOTRIA Westwood.

**Allotria xanthopsis** sp. n.

♂.—Length 1.2 mm. Polished black, very finely sparsely pubescent. Face and cheeks from middle of eye downwards, the clypeus, the palpi and the legs, including all coxæ, bright warm yellow; antennæ 14-jointed, as long as the body, yellowish, the scape only a little longer than the second joint, joints 4 and 5 very slightly longer and thicker than the third or any of the following joints, a little narrowed basally, and, when viewed from the side, appearing slightly curved, the joints beyond these very gradually and imperceptibly shortening, the last joint being the shortest. Wings hyaline, strongly iridescent, ciliated, the veins pale yellowish, the marginal cell a little shorter than in *A. brassicæ*, closed, scarcely twice as long as wide.

*Hab.*—Crescent City, Fla.

Described from a single specimen received from Mr. H. G. Hubbard, and reared by him from the orange aphis, *Siphonophora citrifolii* Ashm.

The species appears to approach closely to the European *A. xanthocephala* Thoms.

## Subfamily VII. SYNERGINÆ.*

### CEROPTRES Hartig.

**Ceroptres frondosæ** sp. n.

♀.—Length 2.6-3 mm. Black; antennæ and legs brownish yellow, all coxæ dusky at base; mandibles piceous with black tips. Head minutely punctate. Thorax closely minutely punctate, sericeous. Face with a median ridge and a few striæ converging towards base of mandibles; parapsidal furrows delicate but distinct; deeper, broader and more sharply defined posteriorly; mesopleura for most part smooth and polished, but along the base hairy and delicately striated; metapleura hairy. The scutellum projects slightly over the metathorax, rugose, the metathorax short, abruptly declining, with two distinct parallel carinæ on the disc and on each side a long transverse fovea. The abdomen is black, polished, not longer than broad vertically and pubescent at base of second segment, the delicate connected suture distinguished with difficulty, and only visible when examined with the lens carefully from the side; the sheaths of the ovipositor project about 0.6 mm. above the dorsal surface; the third, fourth and fifth segments are exceedingly short; the fifth and sixth segments and the ventral valve are brown, or yellowish brown, and, if examined carefully, exhibit a fine, delicate punctuation. Wings hyaline, pubescent; the veins pale yellowish; in one specimen the cubital cell is not defined, and the areolet is without the inner side vein; the other specimens have the cubital cell and the areolet distinct.

*Hab.*—St. Louis, Mo.

Described from three ♀ specimens reared May 1, 1870, by Dr. C. V. Riley, from *Andricus frondosa* Bass.

**Ceroptres rufiventris** sp. n.

♀.—Length 2 mm. Head and thorax black; finely, minutely punctulate, sparsely clothed with a fine pile, the vertex smooth, shining, the face pubescent; antennæ and legs, including all coxæ, brownish yellow; mandibles and palpi yellowish; abdomen rufous. The antennæ are 13-jointed, filiform, not thickened toward tips, the third and fourth joints about equal in length, the fourth very slightly longer, the terminal joint one-third longer than the penultimate. Thorax subopaque, the parapsidal furrows very delicate, subobsolete, and poorly defined anteriorly; pleura smooth, highly polished, with a tuft of white hair beneath the tegulæ and pubescent along the base; metapleura more densely pubescent; scutellum minutely rugose, apparently without foveæ at base and pubescent. Abdomen normal, pubescent at base of second segment above, the sheaths of the ovipositor quite prominent. Wings hyaline, the veins pale yellow, the cubital cell only partly closed, the areolet complete, but the surrounding nervures faint.

*Hab.*—Cadet, Mo.

Described from a single specimen bred April 19, 1883, from *Andricus ostensackenii* Bass. Received by Dr. C. V. Riley from J. G. Barlow.

This species approaches nearer to *C. ficus* Fitch, but is at once distinguished by the different colored head and thorax, the delicately marked parapsidal furrows and the rufous abdomen.

* Formerly INQUILINÆ.

**Ceroptres politus** sp. n.

♀.—Length 1.8 mm. Polished black; antennæ and legs brownish yellow, the middle and posterior coxæ black, the anterior and middle femora dusky, the posterior femora black; antennæ subclavate, 12-jointed, reaching nearly to the middle of abdomen, the third joint slightly shorter than the fourth, the terminal joint being the longest and thickest. Head and thorax polished, subpubescent, the pubescence denser on face, cheeks and metathorax. Thorax with the parapsidal furrows delicate, subobsolete anteriorly; there is a short median grooved line posteriorly and a short faint line on the scapulæ; the scutellum is minutely rugose, bare, the foveæ at base small, indistinct; mesopleura highly polished, bare, with a groove near the posterior margin. The abdomen is one-third longer than wide vertically, subcompressed, highly polished, black, although sometimes brown or piceous at base; the third, fourth, fifth and sixth segments short, the sheaths of the ovipositor being short and not projecting above the dorsum. Wings hyaline, the veins pale and delicate, the cubitus, areolet and cubital transverse vein usually not at all developed, although in some specimens they can be detected, but are exceedingly faint.

The ♂ has 15-jointed, honey-yellow antennæ, the scape alone being dusky, the third joint is straight and unlike all other *Ceroptres*, being without the usual emargination; otherwise it agrees with ♀.

Described from one ♂ and seven ♀ specimens. The females were observed May 20 ovipositing in the midrib of a leaf of *Quercus rubra*.

**EUCEROPTRES** n. g.

This genus is at once distinguished from *Ceroptres* by the ♀ having thirteen distinct joints in the antennæ, the usually connate suture dividing the second abdominal segment is as distinct as the others and very oblique, dividing the segment into two equal parts; the head is large and wider than the widest part of the thorax, while the posterior tibia has two distinct apical spurs. The ♂ has 15-jointed antennæ, the third joint being longer than the fourth and excised. The other characters agree with *Ceroptres*, except the sheaths of the ovipositor are small and do not project.

**Euceroptres primus** n. sp.

♀.—Length 2 mm. Black; antennæ brownish yellow, the basal joint black; legs brown, all coxæ black, femora and posterior tibiæ obfuscated; mandibles brown. Head and thorax minutely punctulate, very slightly transversely rugulose; parapsidal grooves delicate, but distinct, and with two short lines between them anteriorly; scutellum rugose, the foveæ at base, distinct; mesopleura highly polished; metathorax short, abrupt, rugose, bicarinated. Abdomen ovate, slightly compressed, hardly as long as the thorax, smooth, highly polished, the segments very oblique, the petiole short, wrinkled. Wings hyaline, pubescent, the veins pale brown, the radial cell and areolet closed, cubital cell partially closed, the cubitus extending to apical margin.

The ♂, in colorational details, agrees with the ♀, but the antennæ are longer, filiform, 15-jointed, the third joint longer than the fourth and distinctly emarginated.

Described from one ♂ and two ♀, labeled No. 2640 received from Dr. Wittfeldt, of Georgiana, Fla., reared March 24, 1882, and from a smaller form, but 1½ mm. in length, labeled No. 780 P, reared July 3, 1883, from a gall found on *Quercus alba* near the Merrimac River, Massachusetts.

This latter may be a distinct species, but I could detect no good characters to separate it.

## PERICLISTUS Förster.

**Periclistus smilacis** n. sp.

♀.—Length 2.8 mm. Black, subopaque, densely, minutely punctulate; antennæ ferruginous. Legs brownish yellow, all the coxæ dusky basally, the posterior pair usually black, the anterior pair sometimes concolorous with the legs; palpi pale. Head finely, confluently punctate, almost smooth and slightly shining on the vertex, the face pubescent, with a distinct medial ridge. Thorax more densely punctulate, the parapsidal grooves distinct throughout, a long median groove posteriorly and two short grooves between the parapsides anteriorly, while on the shoulders is a distinct, rather long grooved line; mesopleura smooth, highly polished, bare on the disc, pubescent beneath wing and along the mesosternum: scutellum rugose, the foveæ at base, large, transverse, nearly confluent. Abdomen polished black, slightly pubescent basally, the ovipositor sheaths distinct, projecting. Wings hyaline, pubescent, the veins pale yellowish, the neuration as in *piratus*.

The ♂ differs from ♀ only in its smaller size, being but 2 mm. long, and in the usual sexual differences; the antennæ are 14-jointed, the third joint being strongly emarginated.

Described from thirteen specimens, labeled No. 864, reared April 28, 1871, and four numbered 1010, reared February 4, 1884, from *Diastrophus smilacis* Ashm.

**Periclistus californicus** n. sp.

♂ ♀.—Length 2-2.4 mm. Similar to *P. smilacis*, the punctuation finer, the pubescence denser, antennæ dark brown. Legs reddish yellow, sometimes obfuscated, the middle and posterior coxæ black, shining. The parapsidal grooves are only distinct on the posterior half of the mesonotum, entirely wanting anteriorly, and there is no distinct grooved line on the shoulders, while the short anterior median grooves are wanting; scutellum rugose, foveæ large, distinct, oblique; mesopleura smooth, highly polished. Wings hyaline, pubescent, iridescent, veins brown, the areolet large, cubital and marginal cells closed. Abdomen densely black, highly polished.

Described from nine specimens, labeled No. 125, reared during July, 1886, by Mr. Albert Koebele from *Rhodites polita* Ashm. and numerous other specimens labeled No. 3839, reared at the Department during January and February, 1886, from the same gall collected in Wyoming and Colorado.

## SYNERGUS Hartig.

**Synergus agrifoliæ** sp. n.

♀.—Length 2-2.4 mm. Brownish yellow, the legs and coxæ paler, the metathorax dusky; ocelli, eyes and mandibles black, or brown-black. The face and pleura are finely striated, head and thorax finely minutely rugose, pubescent, the parapsidal furrows wanting, the foveæ of scutellum small, shallow, hardly apparent; antennæ 13-jointed, flagellar joints 2 and 3 equal, little shorter than the first. The abdomen is not quite as long as the head and thorax combined, slightly compressed, and vertically it is almost as wide as long with the tips sometimes dusky. Wings hyaline, pubescent, the veins pale or hyaline, the areolet distinct, but the closing vein very delicate: in two specimens it is absent.

The ♂ is but 1.5 mm. long, and, excepting the black eyes and ocelli, entirely brownish yellow.

*Hab.*—Los Angeles, Cal.

Described from thirteen specimens, bred by Mr. Albert Koebele from a gall not unlike *Neuroterus saltatorius* Edw. occurring on *Quercus agrifolia.*

**Synergus atripennis** sp. n.

♀.—Length 3.4 mm. Stature similar to *S. pomiformis* Ashm. Head brown, the vertex, occiput, mandibles, thorax, petiole and wings black; head and thorax minutely rugulose, the mesonotum transversely rugulose, the face and pleura, except at middle, coarsely striated. The antennæ are long, filiform, and remarkable in having fifteen distinct joints; mesonotal furrows distinct; scutellar foveæ shallow, poorly defined, while the cubital, areolet and marginal cells are closed.

*Hab.*—Crescent City, Fla.

Described from five specimens bred June 28, 1883, by Mr. Henry G. Hubbard, from *Holcaspis ficula* Bass.

The black wings and 15-jointed antennæ readily distinguish the species.

**Synergus brevicornis** n. sp.

♀.—Length 2.8-3 mm. Stature similar to *S. læviventris*, but the sculpture of the thorax is more rugose, the abdomen proportionately shorter, the ventral valve projects slightly, and the antennæ reach back only two-thirds the length of thorax. Vertex of head, thorax and abdomen black; orbits cheeks, face, antennæ and legs, brownish yellow, the depth of color often varying; middle and posterior coxæ black, the front pair often dusky basally, posterior femora often more or less clouded; antennæ 13-jointed, filiform, the third joint one-third longer than fourth; face and mesopleura rather coarsely striated; scutellum rounded, depressed at base with two distinct foveæ; the grooves of the mesonotum rounded, almost obsolete by the coarse sculpture. Abdomen highly polished, the second segment entirely hiding all the others and gaping open at apex, in consequence the ventral valve projects, is brownish and armed with a slight spine. Wings hyaline, pubescent, the veins pale, the submarginal and marginal veins brownish apically; areolet large, closed, the cubital cell only partially closed.

The ♂ is but 1.8 mm. long, with the head wholly, except stemmaticum, and the legs, including coxæ, brownish yellow. The antennæ are short, 15-jointed, the third joint long, strongly excised, the apical joint brown.

*Hab.*—Eldorado County, California.

Described from one male, eighteen females reared during February, 1881, from a twig gall, *Andricus* sp. on *Quercus wisliceni*, collected by Mr. Albert Koebele.

## Family ICHNEUMONIDÆ.

### Subfamily II. OPHIONINÆ.

### Tribe I. *Anomalonini.*

#### EXOCHILUM Wesmael.

**Exochilum acronyctæ** sp. n.

♀.—Length 26 mm. Head and thorax black, punctulate; clypeus connected with a line on face, anterior and posterior orbits abbreviated above and only represented there by a dot at summit of eyes, yellow; antennæ and legs fulvous; the two basal antennal joints entirely and the third joint basally, black; coxæ and apical two-thirds of posterior femora and nearly the apical half of tibiæ, black; petiole of abdomen, the second segment, except a longitudinal line above, the third segment and a blotch on the side of the fourth at base rufous, rest of the abdomen black. Wings fuliginous, the outer edge of costæ fulvous.

*Hab.*—Placer County, California, and Washington, D. C.

Described from two specimens, one labeled No. 49♂, reared March 30, 1886, from *Acronycta lupina*, in California, by Mr. Albert Koebele; the other reared June 8, 1883, from *Acronycta hastilifera* at Department of Agriculture.

This large and beautiful form is allied to *Ex. tenuipes* Cress. and *Ex. mundum* Say, from both of which it is separated by the different colored legs and abdomen.

#### ARGYPON Förster.

**Argypon prædiscæ** sp. n.

♂ ♀.—Length 7-8 mm.; ovip. ⅔ mm. Head and thorax black, rather coarsely punctulate, the punctures on the mesothorax anteriorly more or less confluent; the insect is sparsely covered with a white pubescence, much denser on the pleura; the mouth parts, face, broad orbital lines connected above with broad post-orbital lines that occupy the whole sides of the cheeks, vary in color from ferruginous to yellow. The antennæ, when bent backwards, reach to the apex of the petiole; they are ferruginous, the apical half and the scape above and the second joint basally, black; in the ♂ they are wholly black, except beneath, for about half their length. The superior margin of prothorax, extending from tegulæ but not quite meeting in front, is broadly ferruginous or yellow; tegulæ reddish yellow. Legs ferruginous, anterior and middle pairs a little paler, posterior pair have the first joint of trochanters unusually long, superiorly dusky, the second joint above is also black or dusky, the femora at base and apex and the tibiæ at apex are dusky; the metathorax is produced into a neck at apex, the length of the neck being about two-thirds the length of the posterior coxæ, to which is attached the abdomen; the whole surface is rugose, and there is a longitudinal shallow channel extending from base of post-scutellum to the produced

apex. Abdomen long, slender, compressed throughout, at least twice as long as the head and thorax together, ferruginous; the petiole and first segment are about equal in length and very slender; the second segment dorsally, the third less distinctly, a blotch at apex of fifth, all of sixth, and the base of seventh, dusky or black; in the ♂ the second and third wholly, a blotch on the fourth, apex of the fifth and the following segments, including claspers, except extreme edge of last segment, are black. Wings short, hyaline; the stigma and veins pale brown; the discal areolet is wanting, and the third discoidal cell is rather narrow, the cubital nervure slightly curved and interstitial with the discoidal nervure, the first recurrent nervure is, therefore, absent, a peculiarity not before noticed in the group.

*Hab.*—St. Louis, Mo., and Fortress Monroe, Va.

Described from several specimens labeled 3422$^{Ol}$, reared July 10th, and August 7th and 10th, 1884, from a Tortricid, *Prædisca* species, found at Fortress Monroe, and a single specimen, labeled No. 750$^{Po}$, bred by Dr. C. V. Riley, from an unknown Tortricid in Missouri, April 23, 1877.

## Tribe III. *Porizonini.*

## Tribe IV. *Pristomerini.*

### EIPHOSOMA Cresson.

**Eiphosoma pyralidis** n. sp.

♂.—Length 12 mm. Black, shining; the thorax with some coarse scattered punctures; face, pleura and metathorax sparsely covered with long white pubescence; the face, mouth parts, anterior orbits to summit and an abbreviated post-orbital line, yellow ferruginous: ridge of collar, prosternum, except apex, two oval spots anteriorly on middle lobe of mesothorax; scutellum, tegulæ, tubercles and a triangular spot in front of them, an oblong spot beneath the insertion of posterior wings and the apex of metathorax connected with lateral lines not extending to the meta-scutellum, yellow. The anterior and middle legs are pale yellow ferruginous; the posterior pair red, their coxæ, except at apex, first joint of trochanters and second joint above, the base and apex of femora, the tibiæ, except a blotch on the middle, and tarsi, black; the tooth on femora beneath near the apex, characteristic of the genus, is small. Abdomen very long, slender, compressed, ferruginous, the petiole very slender, about as long as the second segment, luteous; the slightly swollen apex black; the second segment, except at apex, is dorsally black; the third and following segments are of nearly an equal length, hardly half the length of the second, base of third and a narrow line at base of fourth, fifth and sixth segments, and the terminal segments wholly, except a blotch at sides, black. Wings hyaline; stigma, except a pale streak at base, and the veins brown; the discal areolet is subtriangular, petiolate.

*Hab.*—Kirkwood, Mo.

Described from a single specimen received from Miss Mary Murtfeldt, labeled "Parasite on *Pyralid* (?) or *Solidago*, June 12, 1885."

### PRISTOMERUS Curtis.

**Pristomerus euryptychiæ** n. sp.

Honey-yellow, or pale yellow ferruginous; the head brown; antennæ black, the basal joints beneath and the incisions of the third, fourth and fifth joints, yellow; the sutures surrounding the scutellum and base of metathorax black; posterior femora has a dusky subapical band, armed beneath, beyond the middle, with a large tooth, followed by several minute denticulations; the base and apex of posterior tibiæ are also black, their tarsi dusky, the joints somewhat paler basally; metathorax areolated. The abdomen is gone and cannot be described, although in all probability it was concolorous with the thorax. Wings hyaline; the stigma is very large, triangular, dark brown, the veins paler; the areolet wanting.

*Hab.*—District of Columbia.

Described from one specimen bred May 19, 1884, from *Euryptychia saligneana* Clem.

## Tribe VII. *Ophionini.*

### EREMOTYLUS Förster.

**Eremotylus arctiæ** sp. n.

♂.—Length 26 mm.; wing expanse 35 mm.; ♀ 20-28 mm.; expanse 36 40 mm.

This species is closely allied to *Ophin. macrurum* Linn., and is no doubt confused in our collections with that species; it is, however, slightly smaller, and may at once be distinguished by the following differences:

| **O. macrurum** Linn. | **E. arctiæ** n. sp. |
|---|---|
| Wings with a decided fulvous tinge and the veins fulvous; the second recurrent nervure is abont twice as long as the first recurrent nervure, the third discoidal cell, therefore, is much wider at apex than at base. | Wings without the fulvous tinge and the basal nervure, tips of median and discal nervures vary from brown to black, or piceo-black; the second recurrent nervure is only slightly longer than the first recurrent nervure the cubital nervure being arcuate and the third discoidal cell, therefore, is about as wide at apex as at base. |
| Transverse metathoracic carina is always more or less distinctly sinuated at the middle. | Transverse metathoracic carina is straight. |
| Spinulæ on hind wings vary from 13 to 15. | Spinulæ on hind wings vary from 7 to 9. |

*Hab.*—Washington, D. C.; Jackson, Miss.; Vineland, N. J.; Selma, Ala.; and Alameda, Cal.

Described from one ♂ labeled "Bred from *Saturnio io*," received from Mrs. Mary Treat, Vineland, N. J.; one ♀, labeled No. 995$^{Po}$, reared Feb. 8, 1879, from *Ecpantheria scribonia;* another, No. 408, bred by Mr. E. A. Schwarz, at Jackson, Miss., Feb. 27, 1879, from

*Arctia virginica;* besides a single ♀ received from Prof. J. A. Willet, Selma, Ala., "reared from a cocoon found under pine bark;" a single specimen captured at large in Alameda County, California, by Mr. Albert Koebele; and one ♀ in my collection from Tennessee.

The species is, therefore, quite extensively distributed throughout the country as *O. macrurum*, and judging from the above rearings confines its attacks to various Arctiids.

To this genus also belongs *Thyreodon texanus* Ashm., *Ophion slossonæ* Davis, is apparently a synonym of this species.

## Tribe VIII. *Campoplegini.*

### CHAROPS Holmgren.

**Charops apaturæ** sp. n.

This species in size and stature is similar to *Charops tibialis* Cr., described from Texas, but is decidedly different in the color of the legs, these are ferruginous; all the coxæ and the first joint of posterior trochanters black; the hind femora at base and apex and the apices of tibiæ and tarsi dark fuscous, the joints of the tarsi more or less paler basally.

*Hab.*—Fairburg, Ill.

Described from one specimen received from Mr. A. C. Mundt, and bred by him from the larva of *Apatura clyton.*

### LIMNERIA Holmgren (*sens. lat.*).

The following table will aid in separating the species described below:

Wholly ferruginous, the vertex of head only black.....**L. rufa** n. sp.
Head and thorax black.
Abdomen not wholly black; red, or banded with red.....2.
Abdomen wholly black, legs ferruginous.....**L. acronyctæ** n. sp.
2. Abdomen banded or blotched with ferruginous.
Hind coxæ and first joint of trochanters black.....**L. heliæ** n. sp.
Hind coxæ and legs ferruginous.....**L. nephelodis** n. sp.
Abdomen wholly ferruginous.....**L. ephestriæ** n. sp.

**Limneria rufa** n. sp.

♂.—Length 4 mm. Wholly ferruginous, the vertex of head dusky or black, sparsely covered with a white, glittering pubescence, more apparent on face and pleura; mandibles, palpi and trochanters pale yellowish white; antennæ brown, the two basal joints pale; tegulæ pale whitish; apical spurs on middle and posterior tibiæ very long, divergent. Wings hyaline; stigma and veins brown, the outer edge of costæ and stigma black; the discal areolet is rather large, subpetiolate, the cubital nervure bent before the middle.

*Hab.*—St. Louis, Mo.

Described from two specimens, labeled No. 2640, reared July 19, 1869, from *Aplodes rubivora* Walsh.

It is very distinct from any other of our described species of *Limneria*.

**Limneria acronyctæ** n. sp.

♂.—Length 4 mm. Wholly black; face and body covered with a sparse white pubescence; two basal joints of antennæ ferruginous; mandibles and palpi pale. Legs ferruginous; the base and apex of posterior tibiæ black, their tarsi more or less fuscous; tibial spurs of middle and hind legs large, divergent, pale; metathorax areolated; the abdomen is a little longer than the head and thorax together, but slightly compressed, black, the venter yellowish, with a longitudinal fold its whole length, tegulæ yellowish white. Wings hyaline, subiridescent; stigma and veins pale brown; the discal areolet is small, petiolate, the cubital nervure bent a little before the middle, the second recurrent nervure about two and a half times the length of the first.

Described from one specimen reared from *Acronycta oblinata*.

This species approaches nearest to *L. obliterata* Cress., but can be at once distinguished from it by the distinct, petiolate areolet.

**Limneria heliæ** n. sp.

♂.—Length 7 mm. Black; mandibles and palpi pale; face covered with glittering white pile; antennæ entirely black. Legs ferruginous; posterior coxæ and first joint of trochanters black, the second joint pale, femora with a dusky spot at apex above, tibiæ and tarsi dark fuscous; metathorax areolated, its disc covered with some long white pubescence. Abdomen only slightly compressed, the extreme apical margins of all the segments beyond the petiole ferruginous, that on the second segment being the widest, the third has a large red spot at sides connected with a line above, the fourth also has a blotch at the sides, and the fifth with a very small one; the sheaths of the penis are exserted, and are somewhat curved and hook-like, their tips being bluntly rounded. Wings hyaline; the stigma and veins dark brown, piceous; discal areolet rather large, triangular, subsessile; the cubital nervure is bent a little before the middle, the second recurrent nervure not more than twice the length of the first.

*Hab.*—Washington, D. C.

Described from one specimen labeled No. 3288$^{0}$, reared April 28, 1884, from *Helia ænula* Ill.

This species appears to be closely related to *L. oxylus* Cress., but in that species the areolet is distinctly petiolated.

**Limneria nephelodis** n. sp.

♂.—Length 4 mm. Black, covered with a white pubescence, the face especially so; mandibles and palpi pale; antennæ, except the two basal joints, beneath which are ferruginous, black. Legs entirely ferruginous, the posterior tarsi alone dusky; metathorax areolated, the disc not pubescent. Abdomen about half again as long as the head and thorax together, black; the apical half of second segment, apical two-thirds of the third, the fourth wholly, and a spot on the sides of fifth along the venter ferruginous. Wings hyaline: stigma and veins brown; the discal areolet of moderate size, petiolate; the submedian cell is a little longer than the median, and the second recurrent nervure is half again as long as the first.

*Hab.*—St. Louis, Mo.

Described from a single ♂ labeled No. 2[illegible]L, reared by Dr. Riley in Missouri, Aug. 7, 1872, from *Nephelodes violans*.

This species comes nearest to *L. obscurus* Cress., and it may be the male of that species, but this cannot be definitely settled until the ♀ is bred.

**Limneria ephestriæ** n. sp.

♂ ♀.—Length 6 mm.; ovip. hardly exserted. Head and thorax black, covered with a white pubescence: mandibles and palpi pale; antennæ black, two basal joints beneath ferruginous. Abdomen, except basal half of petiole which is black, and legs entirely ferruginous, the posterior tarsi alone being slightly dusky; in the ♂ the second abdominal segment, basally, is also black. Wings hyaline; stigma and veins pale brown; tegulæ yellowish white, this color extending along the costa basally; the discal areolet is of moderate size, petiolate, the second nervure being about half again as long as the first.

*Hab.*—Missouri.

Described from two specimens, one ♂ one ♀, labeled No. 239[x], reared July 10, 1872, by Dr. Riley, "from something feeding on wax, perhaps *Ephestria zeæ*."

It closely resembles *L. subrubidus* Cress., but the ♀ of that species is unknown, and the ♂ is described as having "the first, second, except tip, and the extreme base of the third [abdominal] segments black, apex sometimes slightly obfuscated," which certainly does not agree with the above ♂; besides *L. subrubidus* must be a larger insect, it is described as being 3½ lines long.

## Tribe X. *Mesochorini.*

### MESOCHORUS Grav.

**Mesochorus aprilinus** n. sp.

♀.—Length 2½-3 mm.; ovip. very short. Pale honey-yellow, or yellowish white; vertex of head, dorsum of mesothorax and metathorax red-brown, the latter sometimes black; stemmaticum and tips of mandibles black. Abdomen black, with a large oval luteous spot occupying most of the upper surface of the second and third segments; a spot at base of posterior tibiæ and the apex brown. The antennæ are 31-jointed, filiform, nearly the length of the insect; metathorax areolated: the longer spur on posterior tibiæ is hardly half the length of the first tarsal joint. Wings hyaline; stigma and veins hyaline, the costæ alone slightly luteous.

*Hab.*—Washington, D. C.; N. J., N. Y., Mass., Conn. and Ill.

Described from five specimens labeled No. 227[a], reared April 12 to 18, 1881, from *Apanteles utilis* French, and other specimens from the cocoons of other *Apanteles*. The species is closely allied to *M. scitulus* Cress.

## Subfamily II. TRYPHONINÆ.

### Tribe I. *Mesoleptini.*

#### SPANOCTECNUS Förster.

**Spanoctecnus caseyi** sp. n.

♂.—Length 4 mm. General color reddish yellow; stemmaticum, occiput, lateral ridges of mesonotum, depression at base of scutellum, metanotum, metasternum and abdomen, except base of petiole and the third and fourth segments, which are yellow, black; two basal joints of antennæ, except spot above, the face, the mandibles, palpi, prosternum, anterior and middle coxæ and trochanters, and the hind trochanters, white; tip of hind femora and most of their tibiæ, except beneath, brownish or fuscous.

*Hab.*—Norfolk, Va.

Described from a single ♂ specimen received from Captain Thos. L. Casey, and in honor of whom the species is named.

#### SYCHNOLETER Förster.

**Sychnoleter americanus** sp. n.

♂.—Length 7.5 mm. Ferruginous, finely punctate; head black, sericeous, the clypeus piceous; mandibles pale rufous; antennæ longer than the body, mostly black; joints 1-4 rufous, the flagellar joints 10-13 yellowish white. Wings hyaline, the veins brown, the costa nearly black; metathorax completely areolated, the middle area hexagonal. Legs long, slender, the hind pair much the longest, first joint of all tarsi longer than the following joints united. Abdomen slender, longer than the head and thorax united, with a whitish spot at tip, the petiole about as long as the second and third segments united, the spiracles situated at about two-thirds its length, the second segment a little longer than the third, the fourth about four-fifths the length of the third, the fifth a little shorter than the fourth, the following segments very short.

*Hab.*—Jacksonville, Fla.

Described from one ♂ specimen.

#### PERILISSUS Förster.

**Perilissus southwickii** sp. n.

♂.—Length 5.5 mm. Head above, the thorax, except prosternum and lower margin of collar, the petiole, except at apex, and apex of abdomen, black; face, cheeks, mandibles, except teeth, antennæ, prosternum, lower margin of collar, legs and middle of abdomen, ferruginous. Wings hyaline, or with a slight tinge, the stigma, except a pale spot at base, and veins dark brown, the costa towards base and the tegulæ pale yellowish. The head and thorax are finely punctate, the head subquadrate, the parapsidal furrows incompletely defined or wanting, while the metathorax is completely areolated.

*Hab.*—Central Park, N. Y.

Described from a single specimen collected by Mr. F. B. Southwick, and in honor of whom the species is named.

**Perilissus paniscoides** sp. n.

♀.—Length 7.5 mm. Polished, impunctate, and of a uniform pale honey-yellow color, except the stemmaticum, the eyes and the teeth of the mandibles, which are black; ocelli very large, pale, situated on a black spot; metathorax smooth, exareolated. Wings hyaline, the costal vein and stigma honey-yellow, the internal veins dusky, the cubito-discoidal vein strongly curved, the areolet subsessile.

The ♂ differs in no particular from the ♀, except in having a slightly smaller head, and in having the abdomen faintly dusky at apex.

*Hab.*—Central Park, N. Y., and Canada.

## Tribe II. *Exenterini.*

### DIABORUS Förster.

**Diaborus maculiventris** sp. n.

♂.—Length 7 mm. Black; anterior orbits, extending on to the cheeks, the clypeus, the mandibles, except teeth and a spot at base, the palpi, the tegulæ, a line in front on superior margin of collar, the venter and triangular spots on apical middle of each dorsal abdominal segment, white or yellowish white. The spots on dorsal abdominal segments gradually increase in size and become bands towards the apex of abdomen. Legs, except coxæ, rufous, apex of anterior and middle coxæ and their trochanters more or less honey-yellow, the first joint of trochanters above, however, as well as the posterior trochanters are usually black; middle and hind tarsi and tips of hind femora fuscous. Wings hyaline, the veins brown; metathorax completely areolated. Abdomen longer than the head and thorax united, the first and second segments finely rugulose, opaque.

*Hab.*—White Mountains, N. H. (Prof. Albert Morse).

The species comes very close to *Diaborus literatorius* Linn., of Europe, and may be the American form of that species.

### EXYSTON Schiödte.

**Exyston abdominalis** sp. n.?

♂.—Length 5 mm. Head, thorax, antennæ, coxæ, except tips of anterior and middle pairs, and first abdominal segment black; lower half of face, clypeus, mandibles, except teeth and a small spot at base, legs and the abdomen, except as hereafter mentioned, rufous or ferruginous; the palpi, tips of scutellum, tegulæ, base of costal veins and trochanters, whitish; base of second abdominal segment and the fourth and sixth at base slightly dusky. There is an obscure spot on hind trochanters above, a dusky annulus towards base of hind femora, while their apices and tarsi are subfuscous. The wings are hyaline, the veins brown.

*Hab.*—Beverly, Mass.

Described from one male specimen received from Prof. Albert Morse, labeled June 14, 1868.

The species comes nearest to *Exyston clavatus* Cress., and may be confused in collections with that species.

## Tribe III. *Ctenopelmini.*

### PRIONOPODA Holmgren.

**Prionopoda coloradensis** sp. n.

♀.—Length 5 mm. Black; antennæ beneath, face below insertion of antennæ, clypeus, lower part of cheeks, mandibles, palpi and legs, except hind coxæ, ferruginous; tegulæ, base of costa, subcostal vein and a spot at base of stigma whitish, rest of stigma and nervures brown-black; ventral segments two, three and four, except oblong black lateral marks, pale; the extreme apex of petiole, apex of dorsal segment two and dorsal segments three and four, except black marks toward the sides, rufous.

*Hab.*—Fort Collins, Colorado.

Described from a single specimen received from Prof. C. P. Gillette.

**Prionopoda beginii** sp. n.

♀.—Length 7 mm. Black; scape beneath, mandibles, palpi, antennæ and middle coxæ and trochanters and their tarsi, and the second joint of hind trochanters, all tibial spurs, and the tegulæ, whitish; stigma and veins black. Legs rufous, the hind coxæ and first joint of trochanters black, their tibiæ, except a narrow white annulus at base, and their tarsi, except first joint towards base, fuscous.

*Hab.*—Sherbrooke, Canada.

Described from one ♀ specimen received from Abbe Bégin, and in honor of whom the species is named.

**Prionopoda ruficornis** sp. n.

♂.—Length 9 mm. Black; antennæ, mandibles, except teeth, legs, including all coxæ, and the abdomen, except basal two-thirds of the petiole *above*, apex of fourth segment and the fifth and following entirely, which are black, all rufous; tegulæ and costæ at base white; stigma, except spot at base, and all veins, brown.

*Hab.*—Ithaca, N. Y.

Described from one ♀ specimen.

### CTENOPELMA Holmgren.

**Ctenopelma pulchra** sp. n.

♂.—Length 8 mm. Yellow ferruginous; spot enclosing ocelli and extending forwards to base of antennæ and also connected with a large spot on occiput, the transverse depression on collar above, the mesonotum, except a cuneiform spot at sides anteriorly and a geminate spot at the middle, the metathorax, except a spot at the spiracles, a large W-shaped mark at apex, a band on hind coxæ above, the abdomen above, except apical margins of the segments and the base of the stigma, black; base and apex of petiole and apical margins of segments white.

*Hab.*—Brookline, Mass.

Described from one ♂ specimen labeled June 21, 1879, received from Mr. Samuel Henshaw.

## Tribe IV. *Tryphonini.*

### GRYPOCENTRUS Ruthe.

**Grypocentrus bimaculatus** sp. n.

♀.—Length 9 mm. Black; face with two angular white marks: clypeus, except at the middle, mandibles, except teeth, tegulæ, the hind angles of pronotum, anterior trochanters and sutures of middle trochanters, most of the anterior and middle tibiæ and tarsi, and the hind tibiæ, except at apex and the first joint of their tarsi at base, white; rest of legs, except apex of hind femora, apex of hind tibiæ and their tarsi which are black or fuscous, rufous. The antennæ above are black, the first two joints whitish beneath, the flagellum beneath ferruginous, the first joint of which is nearly as long as the second and third united. The head and thorax are finely minutely punctulate; metanotum finely rugulose, exareolated, except a distinct petiolar area, which is divided into two divisions by a delicate median carina, the spiracles are distinct, rounded. Wings hyaline, the stigma brown, whitish at the junction with the prostigma, the internal veins black or piceous, the areolet complete, oblique, sessile. Abdomen long, finely shagreened, the sutures from the third, or rather the extreme margins of the segments, viewed from behind, very narrowly whitish.

*Hab.*—Hanover, N. H.

Described from a single specimen received from Dr. Clarence M. Weed.

### MESOLEIUS Holmgren.

**Mesoleius olympiæ** sp. n.

♀.—Length 5.5 mm. Black; lower part of face, the clypeus, cheeks, mandibles, palpi, scape beneath, the tegulæ, a line beneath and a broad line before, tips of scutellums, propectus, anterior and middle coxæ and trochanters, the second joint of hind trochanters, and hind tibiæ, except apical one-third, white; rest of legs, except first joint of hind trochanters, the apical one-third of their tibiæ and their tarsi, which are black, reddish yellow. Wings hyaline, the stigma and veins black. Abdomen black, with the venter, except lateral spots on middle segment white, the dorsal segments have a white spot on the apical lateral angles, while the apical margins of segments 3–8 are very narrowly white.

The ♂ measures from 4.5–5 mm. in length and agrees well with the female, except that the mesopectus is white.

*Hab.*—Olympia, Wash.

Described from several specimens bred by Mr. Trevor Kincaid, June 20, 1893, from pupæ of a willow saw-fly.

## Tribe V. *Exochini.*

### ISCHYROCNEMIS Holmgren.

**Ischyrocnemis pacificus** sp. n.

♀.—Length 4.5–5 mm. Black, shining; head and thorax sparsely minutely punctate; metathorax finely rugulose, completely areolated, the two lateral basal areas smooth; antennæ and legs, except the hind coxæ, rufous. Abdomen, with the venter and the dorsal sutures 2 and 3, ferruginous.

The ♂ has the face, clypeus, mandibles, lower part of cheeks and the anterior and middle coxæ and trochanters white, while the abdominal sutures 2-4 are ferruginous.

*Hab.*—Santa Cruz Mountains, California.

Described from one ♂ three ♀ specimens.

### COLPOTROCHIA Holmgren.

**Colpotrochia ? cinctiventris** sp. n.

♀.—Length 11 mm. Black and shining, but distinctly punctate; face with a rounded spot just above the clypeus; the clypeus, mandibles, except tips, palpi, tegulæ, line beneath, tubercle, anterior and middle tibiæ and tarsi, and the hind tibiæ, except a stripe beneath and the apex, white; rest of legs, except hind femora, tips of their tibiæ and a stripe beneath and the hind tarsi, which are black, reddish yellow; the tibial spurs and a narrow annulus at base of first tarsal joint are also white; metathorax closely punctate, indistinctly areolated behind, but without areas above at base. Wings hyaline, the stigma, except a pale spot at base, and the veins black, the areolet oblique, petiolate. Abdomen clavate, much longer than the head and thorax united, shining black, although sparsely microscopically punctate, with the ventral segments 2, 3 and 4 broadly banded.

*Hab.*—Provincetown, Mass.

Described from a single ♂ specimen received from Prof. Albert P. Morse, taken June 29, 1891.

This species agrees fairly well with genuine specimens of this genus obtained from Europe, except that there is a distinct areolet in anterior wing. It is placed here only temporarily, however, as the distinct areolet will exclude it from this genus, and at present I can find no other genus in which to place it.

### CHORINÆUS Holmgren.

**Chorinæus marlatti** sp. n.

♀.—Length 4 mm. Black; face, clypeus and a spot at base of the emargination of the eyes ferruginous; antennæ beneath brownish. Legs, including coxæ, reddish yellow: the metathorax and the first abdominal segment have four longitudinal carinæ, while the second and the third abdominal segments each have three longitudinal carinæ, but those on the third are abbreviated and extend only to two-thirds the length of the segment.

*Hab.*—Riley County, Kansas.

Described from a single specimen received some years ago from Mr. C. L. Marlatt.

**Chorinæus californicus** sp. n.

♂.—Length 4.5 mm. Black; face, connected with a large spot in the emargination of the eyes, the clypeus, and a spot on scape beneath, yellow; flagellum dark brown. Legs, except hind coxæ, which are black, brownish yellow; the metathorax and the first abdominal segment have four longitudinal carinæ, as in previous species, but the second abdominal segment has only one—a central one, while the third has none at all.

*Hab.*—Santa Cruz Mountains, California.

Described from a single specimen.

To this genus also belongs *Exochus texanus* Cr.

### TRICLISTUS Förster.

To this genus belongs *Exochus pygmæus* Cr., *E. brunneipes* Cr., *E. apicalis* Cr. and *E. fulvipes* Cr.

**Triclistus terminalis** sp. n.

♂.—Length 6 mm. Black; antennæ beneath ferruginous; orbits interrupted above, and face below antennæ yellow. Wings hyaline, the stigma and veins black, tegulæ and base of costæ whitish. Legs mostly black, the anterior legs, except coxæ, ferruginous, their femora above dusky; knees of middle and hind legs, tips of middle tibiæ and tibial spurs white, their tarsi more or less fuscous. Abdomen with the sixth and following segments red.

*Hab.*—Washington, D. C.

Described from a single specimen captured by myself. The species comes nearest to *Triclistus* (*Exochus*) *apicalis* Cr., but is slightly larger with different colored antennæ and legs.

**Triclistus thoracicus** sp. n.

♀.—Length 6 mm. Head black; mandibles and thorax red. Legs reddish yellow. Abdomen rufo-piceous, darker towards apex above; flagellum brown-black.

*Hab.*—Dixie Landing, Va.

Described from one ♀ specimen taken May 27, 1894, by Mr. C. L. Marlatt.

### EXOCHUS Grav.

**Exochus xanthopsis** sp. n.

♂.—Length 6 mm. Black; face and orbits, the latter narrowly interrupted above on the frons and broadly behind the upper part of eyes, yellow. The face has a small dusky median spot; the tegulæ, a broad line before, a narrow line below, a line on the anterior margin of the mesopleura and tips of scutellums, yellowish white. Legs pale reddish yellow, the anterior coxæ and trochanters whitish. Wings hyaline, the stigma and veins black.

*Hab.*—Victoria, V. I.

Described from a single specimen taken by Mr. E. A. Schwarz, June 1, 1893. Comes nearest to *E. evectus* Cr.

### AMESOLYTUS Förster.

**Amesolytus ferrugineus** sp. n.

♂ ♀.—Length 6-7 mm. Pale ferruginous: head, except occiput and a spot behind eyes, the mandibles, except teeth, the palpi, the scape beneath, the superior margin of pronotum, the tegulæ, the scutellums, anterior and middle legs and hind tibiæ and tarsi, except a black annulus at base and apex of their tibiæ, white. Wings hyaline, the stigma and veins brown.

*Hab.*—Texas.

Described from two ♂ and one ♀ specimens.

## Tribe VII. *Orthocentrini.*

### MNESIDÆUS Förster.

**Mnesidæus apicalis** sp. n.

♀.—Length 3 mm. Polished black; middle of face, antennæ beneath, legs, except hind coxæ, and more or less of all femora and abdomen, brownish yellow; hind coxæ black, all femora more or less rufous; tegulæ and palpi whitish; antennæ above brown, first joint of flagellum small, wider than long; metathorax slutaceously sculptured, but without areas, the lateral longitudinal carinæ alone present, but delicate. Wings hyaline, the stigma and veins brownish yellow, the areolet present, pentagonal. Abdomen one and a half times as long as the head and thorax united, subcompressed from the third segment, smooth and polished, except the first segment and the extreme base of the second, which are finely aciculated; the ventral segments 1-4, except some dark blotches laterally, a small spot at the basal outer angle of the second dorsal segment and the three apical segments are entirely yellow; the ovipositor projects slightly beyond the tip; the first segment is nearly as long as second and third united, the second a little longer than the third, the latter being wider than long, the following segments gradually shortening.

*Hab.*—Washington, D. C.

Described from one ♀ specimen taken by myself.

### BREPHOCTONUS Förster.

**Brephoctonus flavosus** sp. n.

♂.—Length 2-3 mm. Yellow; stemmaticum, connected with a blotch on occiput, the sutures surrounding the scutellums, disc of metanotum, the dorsum of first, basal two-thirds of second, and the fifth and following abdominal segments blackish; antennæ above and towards tips brown, the first joint of flagellum slightly the longest, a little more than four times as long as thick; metathorax areolated, the petiolar or apical area divided into two by a median carina. Wings hyaline, the stigma and veins light brown, the areolet wanting, the third discoidal cell twice as long as the second. Abdomen one-half longer than the head and thorax united, with the first and second segments, except the extreme apical margin of the latter, finely aciculated, the other segments smooth; the second segment is about two-thirds as long as the first, or a little longer than wide, the third is about as long as wide, while the following are subequal, about half as long as the second.

*Hab.*—Jacksonville, Fla.

Described from one ♂ specimen.

**Brephoctonus californicus** sp. n.

♂.—Length 2 mm. Black: face below antennæ, mandibles, palpi, scape, pedicel, and more or less of the first flagellar joint, tegulæ, anterior and middle coxæ and trochanters, hind trochanters and the venter white; rest of legs brownish yellow, the hind tibiæ towards tips outwardly and their tarsi outwardly more or less obfuscated; the antennæ are 23-jointed, cylindrical, a little longer than the body, the first flagellar joint very little longer than the second, about four times as long as thick, the following imperceptibly and gradually shortening. Wings

hyaline, the stigma and veins pale; the third discoidal cell is not quite twice as long as the second; the metathorax as well as the sculpture of the first and second abdominal segments is as in previous species.

*Hab.*—Mountain View, Cal.

Described from one ♂ specimen received from Mr. Ehrhorn.

## HYPOLEPTUS Förster.

**Hypoleptus columbianus** sp. n.

♂.—Length 2 mm. Black: palpi, legs, first and second abdominal segments at base and the venter pale yellowish; antennæ 18-jointed, nearly as long as the body, brown: the first joint of the flagellum is a little shorter than the second; metanotum exareolated without carinæ. Wings hyaline, ciliate, the stigma and veins brownish yellow, the areolet wanting. Abdomen, except the first segment, which is aciculated, smooth and polished.

*Hab.*—District of Columbia.

## NEURATELUS Ratzeburg.

**Neuratelus americanus** sp. n.

♀.—Length 2.5-3 mm. Polished black; legs and venter brownish yellow, a blotch above on hind coxæ, hind femora and tips of their tibiæ more or less dusky; antennæ 21-jointed, the terminal joints quadrate, the basal joints of flagellum elongate; metathorax exareolated, alutaceous, with traces of the lateral carinæ posteriorly, the apical transverse carina alone distinct. Wings hyaline, the stigma and veins light brown. Abdomen with the first segment and the second at base shagreened, or finely granulated, the sutures 1, 2 and 3 being pale.

*Hab.*—Fredericktown, Md.

**Neuratelus ulmicola** sp. n.

♀.—Length 2.5–3 mm. Polished black; face, anterior orbits, lower part of cheeks, clypeus, mandibles, pronotum, except a dusky streak above, mesopleura, legs and sometimes a spot at anterior lateral angles of mesonotum reddish yellow, the face and scape beneath more decidedly yellow; the palpi, tegulæ and venter white. Wings hyaline, the stigma and veins brown, the areolet wanting, the third discoidal cell fully twice as long as the second; metanotum exareolated, but with traces of the lateral longitudinal carinæ posteriorly; antennæ 23-jointed, dusky or brownish, except at basal one-third, which is yellowish. Abdomen compressed from the middle of third segment, perfectly smooth and shining, except segments one and two, which are shagreened.

*Hab.*—Columbus, Ohio.

Described from one ♀ received from Prof. F. M. Webster, and bred by him from a leaf-miner on elm, probably *Lithocolletis ulmella* Chambers.

**Neuratelus liriodendri** sp. n.

♀.—Length 2.1 mm. Polished black; face brownish, tegulæ and palpi white; antennæ toward base and legs, yellow; the antennæ are 22-jointed; metathorax smooth, polished, exareolated. Wings hyaline, the stigma and veins pale brown. Abdomen with a yellow blotch at base of third segment, the first segment and basal two-thirds of second aciculated.

In the ♂ the body is mostly yellow, with the stemmaticum, a spot on occiput, sutures surrounding scutellum, metanotum above, the dorsum of first abdominal segment, the second, except at apex, and the fifth and following segments black or dusky.

*Hab.*—District of Columbia.

Described from several specimens taken together on the bark of tulip poplar, and evidently infesting some Tineid larva secreted in the crevices of the bark.

**TAPINOPS** Förster.

To this genus belongs *Orthocentrus californicus* Ashm.

**ATMETUS** Förster.

**Atmetus nigritus** sp. n.

♀.—Length 2 mm. Polished black; ridge of face, upon which the antennæ are inserted, superiorly margined with yellow; palpi, except the last three joints of the maxillary palpi, which are dusky, the mandibles, except tips, and the tegulæ white. Legs brown or fuscous, the coxæ, tips of femora and tibiæ, honey-yellow, the hind coxæ black, or piceous-black: antennæ 23-jointed, brown-black above, beneath yellow, the first flagellar joint transverse, shorter than the second, the joints after the fourth, except the ovate terminal joint, all wider than long; metathorax areolated. Wings hyaline, the stigma and veins pale yellowish, the areolet small, but complete, the second recurrent nervure being interstitial with the outer nervure of the areolet. Abdomen, except the first segment, which is longitudinally aciculated, smooth and polished, the second segment having at basal lateral angles a small yellowish spot separated from the rest of the surface by a delicate grooved line.

*Hab.*—Columbus, Ohio.

Described from a single specimen received some years ago from Dr. Clarence M. Weed.

**Atmetus tetrazonatus** sp. n.

♀.—Length 4 mm. Polished black; superior margin of facial prominence, scape beneath and legs, except hind coxæ, brownish yellow: palpi and tegulæ whitish: apical margin of first, second, third and fourth abdominal segments reddish yellow; venter yellowish white; antennæ 27-jointed, tapering toward tips brown, the flagellar joints, except those near the tips, wider than long, the first a little shorter than the second, the second a little shorter than the third; metanotum areolated. Wings hyaline, the stigma and veins brown, the areolet large, pentagonal, the second recurrent nervure joining it a little beyond its middle, the submedian cell longer than the median. Abdominal segments 1 and 2 and base of 3, shagreened, the first with a longitudinal depression at the middle.

*Hab.*—West Cliff, Colo.

Described from one ♀ specimen received some years ago from Mr. T. D. A. Cockerell.

**Atmetus californicus** sp. n.

♀.—Length 5 6 mm. Head except vertex, a spot at bottom of the frontal excavation and the occiput, the antennæ, except above, the thorax, except three

bands on mesonotum, the scutellum, upper part of mesopleura and metathorax, which are black), the legs, apical margins of the first, the second and the third abdominal segments and venter, all reddish yellow; palpi and tegulæ white; the antennæ are 28-jointed, the flagellar joints short, transverse; metathorax areolated, the surface of areas above finely transversely aciculated. Wings hyaline, the stigma and veins brown, the areolet very large, pentagonal, the second recurrent nervure joining it beyond the middle. Abdomen sculptured as in previous species, the first segment with two tolerably well defined carinæ.

*Hab.*—Santa Cruz Mountains, California.

Described from several specimens.

## Subfamily ICHNEUMONINÆ.

### Tribe I. *Trogini.*

### Tribe II. *Ichneumonini.*

#### LIMERODES Wesmael.

To this genus belongs *Ichneumon perluctuosus* Prov.

### Tribe V. *Phæogenini.*

#### ORONOTUS Wesmael.

**Oronotus albomaculatus** sp. n.

♂.—Length 6.5 mm. Black, punctate and sericeous; anterior orbits below the insertion of antennæ, clypeus lower part of cheeks, mandibles, palpi, spot on dorsum of collar, tegulæ, tubercle beneath, scutellum, anterior trochanters, extreme apex of first joint of hind tarsi, joints 2, 3, 4 and base of joint 5, and a spot on terminal segment of abdomen, white. Legs pale brownish yellow. Abdomen with the first four joints ferruginous, the rest black; antennæ brown-black, sericeous, nearly as long as the body. The form is long, slender; head subquadrate, the eyes large, the pleura and metathorax rugulose, the latter much as in *Linneria*, produced at apex beyond insertion of hind coxæ, with two transverse carinæ, the spiracles small, oval; middle and hind coxæ somewhat widely separated. Abdomen one and a half times as long as the thorax, slender, the petiole smooth, a little shorter than the second segment, the following segments minutely shagreened, pubescent; clypeus large.

*Hab.*—Texas.

Type (♂) in National Museum.

#### PHÆOGENES Wesmael.

**Phæogenes walshiæ** sp. n.

♂ ♀.—Length 5.6 mm.; ovip. but slightly exserted. Brownish yellow; the ♀ with a black streak on mesothorax and scutellum and the three terminal segments of abdomen black; the ♂ is without the black streak on the mesothorax and scutellum, and only the two terminal abdominal segments are black. The head is large, subquadrate, with a transverse carina or ridge just above the base of the antennæ and two warty round dots below the ridge, one on each side near the

eye; in the ♂ the ridge is wanting, antennæ 20-jointed, thickened at tips; parapsidal grooves distinct anteriorly; metathorax areolated. Abdomen long, somewhat linear, about one-third longer than the head and thorax together, subcompressed at tip, minutely shagreened but shining; the petiole is long, slightly widened posteriorly, the spiracles rather prominent, situated on the dilated apical portion, the second segment is about as long as the petiole, the third one-third shorter than the second, the following segments being subequal; at the base of the sheaths of the ovipositor are two prominent hairy styles. Wings hyaline, the stigma and veins brown, the former with a pale spot at base.

*Hab.*—Fairburg, Ill.

Described from one ♂, one ♀, received from Mr. A. Mundt, and bred by him from *Walshia amorphella* Clem.

This species agrees somewhat with Cresson's description of *Phœogenes vincibilis*, but there is no white annulus on the antennæ, and if that species has the transverse ridge on the frons, a very distinct character, it has not been noticed by Mr. Cresson.

## Subfamily V. CRYPTINÆ.

### Tribe I. *Stilpnini.*

#### EXOLYTUS Holmgren.

**Exolytus ithacæ** sp. n.

♀.—Length 12 mm. Head and thorax black; scape beneath, legs, including coxæ and abdomen, rufous; mandibles rufo-piceous; palpi yellowish. Wings hyaline, the stigma and veins piceous-black, the outer nervure of areolet pellucid. Head subquadrate, the frons feebly wrinkled, the face and clypeus rather sparsely punctate: mesonotum sparsely minutely punctate, the mesopleura smooth, impunctate, except the surface near the insertion of middle coxæ: metathorax sloping obliquely from its base, shining, but distinctly wrinkled, more coarsely so posteriorly, the median and petiolar areas confluent, the lateral areas complete. Abdomen long and slender, the body alone, without the petiole, much longer than the head and thorax combined, the petiole very long and slender, only slightly broadened at tip, as long as the hind femora and trochanters united.

*Hab.*—Ithaca, N. Y.

Described from a single ♀ specimen received from Prof. Albert Morse.

#### SELEUCUS Holmgren.

**Seleucus gillettei** sp. n.

♂.—Length 7.5 mm. Polished black; mandibles and legs, except hind coxæ and the first joint of their trochanters, rufous. Wings subhyaline, the stigma and veins black. Abdomen strongly compressed, lanceolate, as viewed from the side.

*Hab.*—Fort Collins, Colo.

Described from one ♂, received from Prof. C. P. Gillette.

**Nelencus rufiventris** sp. n.

♀.—Length 8 mm. Head and thorax, except scutellum, black; antennæ with the flagellum brownish beneath, especially towards base. Legs and abdomen rufous, the latter more or less black above towards apex. Wings subfuliginous, the stigma and veins black.

*Hab.*—Agricultural College, Michigan.

Described from one ♀ specimen received from Prof. Davis.

## Tribe II. *Phygadeuonini.*

### PHYGADEUON.

**Phygadeuon phryganidiæ** sp. n.

♀.—Length 5 mm.; ovip. 1.8 mm. Head and thorax black, subopaque and minutely shagreened. Legs and abdomen rufous; antennæ 25-jointed, brown, the first two joints of the flagellum of about an equal length, more than four times longer than thick, the following joints to the thirteenth gradually subequal, beyond this joint they are short, only a little longer than wide; metathorax areolated; petiole of abdomen longitudinally aciculated, the second segment shagreened, the sculpture of the third being much finer, the segments beyond smooth and polished. Wings subhyaline, being slightly dusky, stigma and veins brown, the stigma with a small pale spot at base, the cubital nervure broken at about the middle by a stump of a vein.

*Hab.*—Alameda, Cal.

Described from two specimens labeled No. 60*o*, reared by Mr. Albert Koebele, from *Phyganidia californica* Packard.

### APSILOPS Förster.

**Apsilops hirtifrons** Ashm.

♀.—Length 6.4 mm.; ovip. 2 mm. Head, antennæ and the thorax, except the white scutellum, entirely black. Legs, including coxæ, red; all trochanters and the apex of posterior femora and tibiæ and tarsi, black. Abdomen wholly dark blue, except a white spot above on the last segment, highly polished; the antennæ are 23-jointed, the second joint of flagellum longer than the first, the third and fourth joints being about equal; the head and thorax above are shining, although densely microscopically punctulate, the pleura and metathorax rugose, areolated, sparsely covered with a short white pile, denser at base and on the sides; spiracles round, the lateral angles subacute, short. Wings hyaline, but having a dusky appearance from the dark pubescence; stigma and veins piceous.

*Hab.*—District of Columbia; Columbus, O.; and Champaign, Ill.

Described from many specimens. A single specimen was bred March 26, 1888, at Department of Agriculture from a Pyralid living in a water lilly. This is the insect mentioned by Mr. Hart as probably being parasitic on *Hydrocampa obliteralis.*

I find I have already described it from a single male specimen under the name *Cryptus hirtifrons*, Proc. U. S. Nat. Museum, 1888, p. 411.

**Otacustes perilitl** sp. n.

♀.—Length 5 mm.; ovip. 0.6 mm. Head, thorax, legs and the abdomen to the base of the third segment, reddish brown; there are blackish streaks on the mesonotum near the base of anterior wings and another small one on the disc; the disc of the metathorax and the terminal abdominal segments are black. The insect presents a minutely shagreened sculpture; the antennæ are 22-jointed, pale brown, the basal joints of the flagellum elongated; the metathorax is areolated, the face of the truncature more oblique than usual. The abdomen is as long as the head and thorax together, its apex compressed, the ovipositor issuing from beneath at the base of the compressed portion. Wings hyaline, with two transverse dusky bands, the first about half the width of the second, enclosing the basal nervure; the second includes the apical two-thirds of the stigma and the entire radial cell, leaving the apex of the wings clear; the stigma has a yellow spot at its base, and the radial cell has a small clear spot close to the stigma; hind wings hyaline.

*Hab.*—Washington, D. C.

Described from one specimen labeled 2919, and the following account of the species is recorded in Department note book by Mr. Pergande:

"Oct. 21st, 1882; noticed, to-day in company with Mr. Schwarz, a species of *Hemiteles* in the act of ovipositing the cocoon of a species of *Perilitus*, perhaps *Perilitus communis* Cress., and the same evening again in the same act. Pinned and marked it No. 2919; the cocoon is placed in a tube to breed.

"It takes several minutes before the fly succeeds in forcing its ovipositor through the tough case and before it reaches its victim; it moves the ovipositor slowly up and down, moving, during this time, the abdomen from side to side, whilst the antennæ are in constant vibration."

## HEMITELES Grav.

**Hemiteles laticinctus** sp. n.

♂.—Length 3.5 mm. Black; the abdomen, except the gastrocœli, the third segment entirely, and the apical edges of the following segments which are red, is also black. The head is polished, the face covered with pale pubescence; antennæ brown, the two basal joints yellow. Thorax finely shagreened; metathorax longer than high, rounded off behind, the transverse ridges distinct, but the areas of the upper surface wanting. Legs reddish yellow. Abdomen with the first, second and third segments aciculated, the following segments smooth. Wings hyaline, the stigma and veins brown.

*Hab.*—New Haven, Conn.

Described from one specimen labeled "parasite on *Leucania unipunctata*, June, 1880."

**Hemiletes euryptychiæ** sp. n.

♀.—Length 4.5 mm.; ovip. 0.8 mm. Robust, the head and thorax black, subopaque, shagreened. Legs reddish yellow; collar and mesopleura red. Abdomen

red, except a subapical black streak on the third segment, and the following segments which are black, except the narrow apical edges; antennæ 25-jointed, basally yellow, the apical two-thirds dark brown; metathorax abruptly truncated posteriorly, areolated. Wings hyaline, iridescent, stigma and veins brown, the former with a large pale spot at base; tegulæ yellowish white.

*Hab.*—St. Louis, Mo.

Described from a single specimen labeled No. 414$^{xoi}$, reared July 8, 1881, from *Euryptychia saligneana* Clem.

## Tribe IV. *Pezomachini.*

### CREMNODES Förster.

**Cremnodes alaskensis** sp. n.

♀.—Length about 6 mm. Uniformly rufous, smooth, polished; collar at sides slightly wrinkled; mesopleura striated; metathoracic carina strong, elevated into acute teeth at sides. Head subquadrate, the face prominently convexly swollen, punctate; maxillary palpi long, 4-jointed; antennæ 18-jointed, gradually incrassated toward tips, the tips dusky. Abdomen pear-shaped, subcompressed, polished, the petiole very long, slender throughout, and nearly as long as the hind femora, longitudinally striated, the spiracles prominent, situated a little behind the middle, the second segment very large, occupying most of the surface, the following segments short, subequal; ovipositor very short, less than one-third the length of the petiole. Legs long, rather slender, the hind pair much the longest, coxæ punctate.

*Hab.*—Fort Wrangle, Alaska.

Types in National Museum (H. F. Wickham, collector).

**Cremnodes tuberculatus** sp. n.

♀.—Length less than 5 mm. Pale ferruginous, but in other particulars, except as follows, agrees with *C. alaskensis:* The prominent convex face is transversely wrinkled; palpi whitish; posterior lateral margins of mesothorax tuberculate; metathoracic spines shorter, only slightly developed, the posterior face wrinkled, while the slender petiole of abdomen is perfectly smooth, except a slight median longitudinal line.

*Hab.*—Santa Cruz Mountains, California.

### THEROSCOPUS Förster.

**Theroscopus americanus** Ashm., n. sp.

♂.—Length 2.1 mm. Ferruginous, subopaque, minutely shagreened; vertex, pleura, sutures around scutellum, metathorax, except disc at base, and disc of petiole, fuscous or blackish. Abdomen black; petiole, except as before mentioned and the extreme apex which is yellowish, ferruginous; apex of second segment yellowish. Legs and antennæ honey-yellow. Head broad, subquadrate; antennæ as long as the body, 19-jointed (?). Thorax elongate, narrowed, the scutellum minute, but distinct; wing pads very small, whitish, scale-like; metathorax about two-thirds as long as the mesothorax with the collar, rounded behind, but with a transverse carina above; abdomen oblong-ovate, much broader than thorax, the petiole very gradually dilated towards apex.

*Hab.*—Arlington, Va.

Reared April 10, 1885, from a *Bucculatrix* cocoon found under stone.

## Tribe V. *Cryptini.*

### CRYPTUS Fabr.

**Cryptus (?) carpocapsæ** sp. n.

♀.—Length 8 mm.; ovip. 3 mm. Head and thorax black. Legs and abdomen brownish yellow; face and broad orbital lines yellow; antennæ black, joints 6–12 white above, collar above, tegulæ and tubercles, a broad band on mesopleura extending from tubercles to base of middle coxæ and connected at the base of the middle coxæ with another band extending to the base of the hind wing; lines along the parapsides abbreviated before and behind, the scutellum and wide bands on the lateral edges of metathorax, all yellow or yellowish white. The head and thorax are minutely punctulate, the collar and pleura with some raised lines and wrinkles; metathorax rugose, a transverse carina on upper surface, and the posterior lateral angles produced into prominent subacute spines. Wings subhyaline, veins piceous, the stigma, except the costal edge, pale brown.

*Hab.*—Mexico.

Described from one poor specimen labeled No. 4208$^{O}$, reared Aug. 29, 1887, from Mexican jumping beans, the seeds of a species of *Euphorbia* inhabited by the larvæ of *Carpocapsa saltitans.*

## Subfamily VI. Pimplinæ.

## Tribe II. *Lissonotini.*

### EUSIMUS Förster.

**Eusimus acrobasidis** sp. n.

♂.—Length 5.4 mm. Head, except occiput and a black spot enclosing ocelli and extending forward to base of antennæ, wholly yellow. Thorax (except dorsum of metathorax) and legs yellow; scutellum yellow, the post-scutellum with a line of the same color; metapleura entirely yellow. Abdomen black, all the segments margined at apex with yellow, and the fourth, fifth and sixth segments at sides are ferruginous, the venter yellow; the antennæ are brown, the two basal joints black above, white beneath; clypeus separated. Wings hyaline, subiridescent; stigma and veins brown; discal areolet oblique, incomplete, the outer nervure being abbreviated; the submedian cell is a little longer than the median, the basal nervure strongly curved inwardly, the cubital nervure bent before the middle, while the second recurrent nervure is half again as long as the first.

*Hab.*—Paxton, Ohio.

Described from a single specimen labeled No. 45$^{02}$, reared July 21, 1885, from *Acrobasis indiginella* Zell, sent to the Department by Mr. John W. Spencer.

### MENISCUS Schiödte.

**Meniscus dakrumæ** sp. n.

♀.—Length 6 mm.; ovip. 4 mm. Black; spot on face, clypeus, mandibles, a spot between the mandibles and the eye, and the palpi, pale ferruginous or yellowish; abbreviated orbital lines and a spot at summit of eyes, yellow; antennæ dark ferruginous, the two basal joints more or less black; most of mesopleura

and the collar at sides and beneath, mesothorax, scutellum, and a small streak on the side of the metathorax, red; the mesothorax is laterally margined with yellow, abbreviated before. Legs yellowish red, posterior tarsi slightly dusky. Abdomen has all the segments after the first margined at apex with red. The thorax, scutellum and metathorax are moderately densely punctulate, the latter having a transverse carina posteriorly. Wings hyaline, strongly iridescent; stigma and veins brown, discal areolet complete, oblique.

*Hab.*—Alameda, Cal.

Described from one specimen labeled No. 3846 , received from Mr. Albert Koebele, reared March 1, 1886, from *Dakruma* feeding on *Lecanium* scale on rose.

Another specimen is labeled No. 420, and agrees with the above, except the yellow orbital line, and the spot at summit of eye are wanting.

## Tribe III. *Pimplini.*

### ICTOPLECTIS Förster.

**Ictoplectis orgyiæ** sp. n.

♂ ♀.—Length 7 mm.; ovip. 2.5 mm.; ♂ 6 mm. Black, shining; clypeus and maxillary palpi piceous; labial palpi, anterior coxæ and trochanters and tegulæ, white; antennæ entirely black. Legs yellowish red, tips of middle tarsal joints fuscous, posterior tibiæ black, with a white annulus at base and a wider one in the middle, their tarsi fuscous or black; the basal half of first, base of second and third joints, white. Thorax smooth, metathorax punctulate with two not sharply defined raised lines extending from base of post-scutellum and becoming obliterated posteriorly; on each side of these lines is a large, smooth space with some coarse separate punctures over the surface. Abdomen coarsely punctured, some of the punctures confluent; the first segment has two abbreviated carinæ dorsally at base, the second has oblique depressions at sides near the base, similar to *Glypta*, but not apparent on the following segments; all the segments have a more or less binodose appearance on account of a transverse depression more distinctly apparent laterally; the hollow venter is whitish with black spots; the sheaths of the ovipositor black, hairy. Wings subhyaline; stigma and veins piceo-black, a spot at base of stigma yellow; discal areolet oblique, with a bulla at base and another on the outer nervure, the second recurrent nervure with two bullæ, the cubital nervure broken just before its middle with a bulla behind the break.

The ♂ differs from the ♀ in having the whole face, the clypeus and both pairs of palpi white; antennæ dark brown; the anterior as well as the middle legs mostly white, the femora stained with yellowish red and the apex of tarsal joints fuscous; the posterior legs are as in the ♀, except all the tarsal joints are white basally.

*Hab.*—Alameda, Cal.

Described from four ♂ and ♀ specimens bred July 4, 1887, by Albert Koebele from *Orygia gulosa.*

## Family CHALCIDIDÆ.

### Subfamily EUCHARINÆ.

#### LOPHYROCERA Cameron.

♂.—Length nearly 5 mm. Head black, coarsely striated; antennæ 12-jointed, filiform, tapering toward tips, the first flagellar joint nearly twice as long as the second, the following subequal in length. Thorax entirely brownish yellow, coarsely reticulated, the scutellum bidentate at apex, the teeth widely separated, sides of mesothorax with broad, obtuse processes, but not very prominent, formed by a median impression on the metanotum and by a lateral impression on the metapleura. Legs and petiole greenish white. Abdomen light brown, but a little darker than the thorax. Wings hyaline, with a slight brownish tinge, the marginal and stigmal veins brown.

*Hab.*—Key West, Fla.

Described from a single specimen, taken July 17, 1894, by Mr. H. F. Wickham.

This interesting species comes nearest to *L. floridana* Ashm., but in that species the thorax is marked with black, the scutellar teeth are also black and conjoined at base, while the metathoracic processes are longer and more distinct.

## Family BRACONIDÆ.

### Subfamily DORYCTINÆ.

#### HETEROSPILUS Haliday.

**Heterospilus caryæ** sp. n.

♀.—Length 4-4.5 mm. Opaque black; basal two joints of antennæ, more or less of collar and legs, rufous; the coxæ and femora more or less fuscous. Wings hyaline, the veins brown. Head quadrate, transversely aciculated; middle lobe of mesonotum and metanotum rugose, the latter areolated; lateral lobes of metanotum and scutellum shagreened. Abdomen oblong, a little longer than the head and thorax united, with an ovipositor as long or a little longer than the body; the first and second segments are long, the latter with two oblique grooved lines, both, however, are coarsely longitudinally striated; the second segment at apex medially, the apical margin of the third and all the following segments are smooth and polished; the third segment, except at apex, shagreened.

♂.—Length 2.25-3 mm. Agrees with the ♀, except the legs are fuscous, the mesopleura below are streaked with rufous, the apical abdominal segments are more or less shagreened basally, while the hind wings are stigmated.

*Hab.*—Morgantown, W. Va.

Described from two ♀ and four ♂ specimens bred by Prof. A. D. Hopkins from a Coleopterous larva living in hickory.

**Heterospilus texanus** sp. n.

♂.—Length 4 mm. Agrees with the former species, but is larger, the legs and collar being black, the tibiæ with a honey-yellow annulus at base, their tips and

tarsi tinged with the same color. Wings subhyaline, with the stigma and veins black, or blackish fuscous, while the second abdominal segment has a transverse furrow a little beyond its middle, but is without the two oblique furrows.

*Hab.*—Cyprus Mills, Texas.

Described from a single specimen.

**Heterospilus? astigma** sp. n.

♂.—Length 4.1 mm. Agrees very closely with *H. texanus*, but the head is shagreened, not transversely aciculated; the metathorax exareolated; the hind wings without the thickened stigma; the second abdominal segment has two oblique furrows connected at about the middle with a curved transverse line, while all the segments, except the last two, which are smooth and highly polished, are opaque, longitudinally striated, with only their extreme apices smooth and shining.

*Hab.*—Morgantown, W. Va.

Described from one ♂ labeled No. 6089, received from Prof. A. D. Hopkins.

## Subfamily HECABOLINÆ.

### ECPHYLUS Förster.

**Ecphylus pallidus** sp. n.

♀.—Length 2-3 mm.; ovipositor fully one and a half times as long as the body. Pale honey-yellow, or brownish yellow; antennæ towards tips and the sheaths of ovipositor dusky. Legs pale yellowish or whitish; middle lobe of mesonotum posteriorly and metanotum wholly rugulose. Wings hyaline, the stigma, except a white spot at extreme base, and veins light brown. The first abdominal segment is long, longitudinally aciculated, the rest of the abdomen smooth and polished, the segments scarcely discernible on account of the fineness of the sutures and the highly polished surface.

♂.—Length 1.75-2.5 mm. Differs in no wise from the female, except in the usual sexual differences, and in having, sometimes, the apex of the abdomen and the hind tibiæ dusky.

*Hab.*—Morgantown, W. Va., and District of Columbia.

Described from one ♀ and one ♂ bred from red-bud by Prof. A. D. Hopkins, and one ♀ and three ♂ bred from the same shrub by Mr. Frank H. Chittenden.

**Ecphylus hypotheuemi** sp. n.

♀.—Length 1.5 mm.; ovipositor not quite as long as the abdomen. Black; palpi, pedicel and an annulus at base of first flagellar joint, the sutures of trochanters, and all tarsi, except the last joint, honey-yellow. Wings hyaline, the stigma and veins light brown. Head quadrate, polished; mesonotum feebly shagreened, the lobes posteriorly smooth and shining, the middle lobe with a longitudinal grooved line posteriorly; metanotum finely rugulose, with a middle carina. Abdomen, except the first segment, which is longitudinally striated, smooth and highly polished.

♂.—Length 1.4 mm. Black; the antennæ toward base, the collar, the lower part of mesopleura, a spot at base of second abdominal segment and the legs, honey-yellow; sometimes the metathorax and two basal segments of abdomen are also honey-yellow.

*Hab.*—Morgantown, W. Va.

Described from one ♀ and two ♂ specimens bred by Prof. A. D. Hopkins, from *Hypothenemus* sp. living in walnut.

**Ecphylus nigriceps** sp. n.

♀.—Length 1.5 mm.; ovipositor half the length of abdomen. Brownish yellow, with the head black; antennæ, except the apical half, and the legs honey-yellow. Head, mesonotum and scutellum smooth, shining; metanotum finely shagreened, without a carina; first abdominal segment striated.

*Hab.*—Morgantown, W. Va.

Described from one ♀ specimen, received from Prof. A. D. Hopkins, labeled No. 5963.

Distinguished at once from the other species by the color, shortness of ovipositor and non-carinated metathorax.

## Subfamily EUPHORINÆ.

### COSMOPHORUS Ratzeburg.

**Cosmophorus hopkinsii** sp. n.

♂.—Length 2 mm. Polished black; mandibles, except tips, rufo-piceous; palpi yellowish; antennæ, except apical half, which is dusky and legs, reddish yellow. Head very large, quadrate, the cheeks subconvex, brown, the occiput distinctly margined, the frons with a delicate central carina; the face below antennæ short, delicately wrinkled, although shining; eyes rather small, rounded, convex; ocelli small, close together in a triangle; antennæ 15-jointed, on a frontal prominence, the prominence with a small horn-like process within, at the base of each antenna; the scape is short, stout, as wide as long; the pedicel also stout, but twice as long as thick; flagellum slender, the joints after the third, subequal; the first and second the longest, about equal. Thorax smooth, without parapsidal furrows; scutellum foveate at base; mesopleura and metathorax rugulose, the latter more or less piceous, the former with an impression across the disc. Wings hyaline, iridescent, the large stigma and the apical part of the costa dark brown; first cubital and first discoidal cells confluent; the second discoidal cell entirely wanting; radial cell closed, reaching nearly to the apex of the wing. Abdomen ovate, petiolate, polished, except the petiole, which is twice as long as thick and finely longitudinally striated.

*Hab.*—Morgantown, W. Va.

Described from several specimens, bred by Prof. A. D. Hopkins, from *Polygraphus rufipennis*.

Since the above was drawn up the ♀ has also been bred by Prof. Hopkins. It agrees well with the ♂, except the antennæ are 17-jointed, while the pro- and metathorax are rufo-piceous. It averages 2.5 mm. in length.

## Subfamily ALYSIINÆ.

### MESOCRINA Förster.

**Mesocrina (?) microrhopalæ** sp. n.

♂.—Length 1.6 mm. Head and thorax polished black; two basal joints of antennæ, mandibles, legs and abdomen, except a blotch above on disc of second segment and the third segment, except margins, brownish yellow; antennæ much longer than the body, filiform, 21-jointed. Thorax with two very delicate, almost imperceptible grooved lines, the scutellum with a large, crenate furrow across the base; metathorax short, sparsely punctate, truncate behind, the superior edge of truncature carinated. Wings hyaline, the stigma and veins dark brown, the former large, ovate, the recurrent nervure interstitial, the second submarginal cell about twice as long as the first. Abdomen oblong oval, composed of only three segments, the second the longest, the first and third nearly equal; the first and second are finely, closely, rugosely punctate, the third smooth and highly polished.

*Hab.*—Roslyn, Va.

Described from a single specimen bred by Mr. F. H. Chittenden from *Microrhopala xerene* Newm., and others taken with the sweeping net.

## Subfamily CHALCIDINÆ.

### ENIACA Kirby.

**Eniaca texana** sp. n.

♀.—Length 4.5 mm. Black, umbilicately punctate and clothed with sparse, silvery white hairs, the thorax above with a slight æneous tinge; anterior and middle legs and hind tarsi red. Wings hyaline, the veins piceous, the marginal vein very long, slender, a little longer than the submarginal, the stigmal and postmarginal veins not developed, the former being represented by a small sessile knob. Head prolonged in front of the eyes with a deep median emargination, the inner and outer margin of each lobe being carinated and connected at apex with a carina, beneath which extends along the inner margin to the insertion of the antennæ; antennæ 13-jointed, black, inserted near the mouth, the scape obclavate, rufous; metanotum long, with several irregular raised lines, the lateral margins from about the middle excised in conformity to the coxal cavities, the apex slightly roundedly emarginated for the reception of the short, rugose and carinated petiole. Abdomen subglobose, polished, except the second segment above on the basal half; the second segment occupies most of the surface, the following segments being very short and more or less retracted within the large second segment; anterior and middle femora clavate, the hind femora greatly swollen and armed beneath with many minute teeth.

*Hab.*—Texas.

Types in National Museum.

Described from two ♀ specimens, one labeled "Texas, Belfrage," the other "College Station, Texas, Banks."

## Subfamily PERILAMPINÆ.

### ELATUS Walker.

**Elatus sisymbrii** sp. n.

♂.—Length 2.2 mm. Head and thorax bright cupreous. Abdomen æneous-black; scape and legs metallic, the knees, anterior tibiæ, tips of middle and posterior tibiæ and all tarsi, except last joint, brownish yellow; flagellum filiform, brown-black, pubescent, the joints transverse. The head and thorax are nearly smooth, impunctate, but with a very delicate, transverse striation; scapulæ posteriorly and the axillæ smooth, the metathorax and petiole shagreened or minutely shagreened with a delicate median carina. The petiole is two and a half times as long as thick, the body of abdomen triangulated as in *Perilampus*, and apparently composed of only two segments, the third being hardly visible, the others retracted. Wings hyaline, the veins yellowish or brownish yellow, the stigmal and postmarginal veins very short, scarcely one-fifth the length of the marginal.

*Hab.*—Las Cruces, New Mex.

Described from one ♂ specimen taken by Prof. T. D. A. Cockerell and confused with several specimens of a genuine *Perilampus*.

This is a most interesting addition to our fauna, and an examination of this genus shows that the Perilampinæ have strong affinities with the Miscogasterinæ.

## Subfamily EURYTOMINÆ.

### EURYTOMA Illiger.

**Eurytoma tylodermatis** sp. n.

♀.—Length 3.5–4 mm. Black, clothed with sparse, whitish hairs; anterior femora beneath and at tips and their tibiæ, knees of middle and hind legs and tips of their tibiæ, and all tarsi, honey-yellow; funicle 6-jointed, the first joint the longest about two and a half times as long as thick, or more than twice as long as the pedicel, the second and following joints subequal, twice as long as thick. Wings hyaline, the veins light brown, the marginal vein not quite twice as long as the stigmal with its knob, the postmarginal a little longer than the stigmal. Abdomen conic-ovate, compressed, a little longer than the head and thorax united smooth and highly polished, except as mentioned below; the petiole is very short, rugose, the second segment is as long as the third and fourth united, the third and fourth being subequal, the fifth is the longest segment, and while dorsally it is only a little longer than the second, yet ventrally it is much longer, the sixth is a little shorter than the third, or about half the length of the seventh; the fifth segment is closely, microscopically punctate at sides and beneath, while the segments 7 and 8 are finely shagreened, subopaque, and sparsely beset with whitish hairs.

♂. Length 3 mm. Agrees with the ♀, except in the usual sexual differences: The flagellum is about five times as long as the scape, the latter dilated beneath, and not longer than the pedicel and first funicular joint united; funicle 5-jointed, each joint deeply excised and pedicellate at apex, the joints very gradually decreasing in thickness from base, the dilated portion of each joint from two and a half to three times as long as thick, with double whorls of long white hairs, the pedicellate portion of the joints increasing successively in length, the first joint

having the shortest pedicel; club 2-jointed; axillæ meeting at base of scutellum, laterally towards base of wing smooth and shining with some fine aciculations; petiole stout, shagreened, a little thicker at base than at apex, about three times as long as thick; body of abdomen subglobose, highly convexly elevated dorsally, the apical segments retracted within the large fourth segment.

*Hab.*—Roslyn, Va.

Described from two ♀ and one ♂ specimens, bred by Mr. Frank H. Chittenden from the larva of a beetle, *Tyloderma foveolatum* Say.

### ISOSOMA Walker.

**Isosoma abnorme** sp. n.

♀.—Length 3–3.5 mm. Black, umbilicate-punctate; scape, trochanters, knees and all tibiæ and tarsi brownish yellow; flagellum rather thick, brown, 6-jointed, the first joint a little shorter than the club, the following subequal, about two and one-half times as long as thick; pronotum about two and three-fourths times wider than long, without pale spots on the anterior angles; mesonotum only two-thirds the length of the scutellum; metanotum about as long as the scutellum with a distinct median impression. Wings hyaline, the veins yellowish, the marginal vein about one-half longer than the stigmal, the latter a little shorter than the postmarginal, with a poorly defined uncus issuing from its extreme tip superiorly. Abdomen with petiole a little longer than the head and thorax united, compressed, the body dorsally at base, convexly elevated, the tip acute, curving upwards, the petiole is rather slender, shagreened and nearly, or quite, as long as the hind coxæ, the fourth, fifth and seventh segments dorsally are about of an equal length, but the fifth centrally is much longer.

*Hab.*—Riley County, Kansas, and Texas.

Of this species, which is not a true *Isosoma*, I have seen but two specimens: one in my collection, received some years ago from Mr. C. L. Marlatt, collected by him at Manhattan, Kans., and another in the National Museum labeled "Texas."

### MERAPORUS Walker.

**Meraporus dubius** sp. n.

♀.—Length 1.8-2 mm. Aeneous-black, punctate, the upper part of thorax and temples more decidedly metallic; scape and legs, except coxæ, brownish yellow, the tarsi a little paler; flagellum æneous-black, pubescent. Wings hyaline, the veins pale, the subcostal being almost white and nearly three times as long as the marginal vein, the latter only a little longer than the stigma. The head is a little more than three times as wide as thick, antero-posteriorly, the occiput delicately margined, the cheeks a little rounded. The thorax has the parapsidal furrows distinct half the length of the mesonotum anteriorly, or a little more; metanotum strongly punctate produced into a subglobose neck and tricarinate, the middle carina extending only to the base of the neck, the lateral folds strongly curved. The abdomen is ovate, shorter than the thorax, flat above, convex or strongly carinate beneath, the second segment the longest, occupying a little more than one-third its surface, with a large fovea at base above, the third segment is about one-third the length of the first, the fourth, fifth and sixth segments are very short, subequal and united are shorter than the third, the seventh segment is as long as the third, while the eighth is visible as a slight conical point.

♂.—Length 1.5 mm. Agrees with ♀, except the head and the thorax, are more metallic green, while the abdomen is rotund-oval, the third segment being half as long as the second, or as long as the following segments united.

*Hab.*—District of Columbia.

Described from two ♀ and one ♂ specimens bred from an unknown Dipterous puparium found in stems of *Ambrosia*.

## HABROCYTUS Thomson.

**Habrocytus rhodobæni** sp. n.

♀.—Length 3.2 mm. Dull bronzed-black, the metathorax and base of abdomen cupreous; scape, pedicel, mandibles and legs, except coxæ, brownish yellow; flagellum brown-black; ocelli red. Head and thorax closely punctate, the head very wide, about four and a half times as wide as thick antero-posteriorly, the cheeks full, the malar suture curved backwards to the base of mandibles; clypeus finely longitudinally striated, the anterior margin with a slight median sinus; antennæ 13-jointed, filiform, inserted on the middle of the face, the flagellum about two and a half times as long as the scape; pedicel small, cyathiform, about one-third the length of the first joint of funicle; funicle 6-jointed, the joints very gradually shortening, the first the longest, about three times as long as thick, or a little longer; the last, or sixth joint, not quite twice as long as thick; scutellum at apex truncate, with a slight rim; metathorax not quite as long as the scutellum, tricarinate, the lateral carinæ or folds very slightly curved at the middle, the spiracles large, oval, not quite twice as long as wide. Wings hyaline, pubescent, the veins light brown, the marginal vein a little more than twice as long as the stigmal, the postmarginal a little shorter than the marginal. Abdomen conic-ovate, a little longer than the head and thorax united, depressed or flat above, subconvex beneath, the second segment about twice as long as the third, the third and following segments all very nearly of an equal length, the last conical.

*Hab.*—Roslyn, Va.

Described from a single ♀ specimen bred by Mr. Frank H. Chittenden, from the larva of *Rhodobænus* 13-*punctata* Ill.

**Habrocytus languriæ** sp. n.

♀.—Length 2.5-3 mm. Black, with sometimes a slight metallic, or bronzy, tinge on the disc of the mesonotum, the metanotum usually brighter metallic green. Abdomen æneous-black, metallic blue and green at base above; scape, tegulæ, trochanters, knees and all tibiæ and tarsi, except last joint, yellowish or brownish yellow, the femora brown, the coxæ black or blue-black; pedicel, except sometimes beneath and flagellum brown or brown-black. Head and thorax punctured; antennæ 13-jointed, filiform; pedicel about half as long as the first joint of funicle; flagellum about two and a half times as long as the scape; funicle 6-jointed, the joints gradually shortening, the first scarcely three times as long as thick, the last not longer than thick. Wings hyaline, the veins light brown, the marginal vein not quite twice as long as the stigmal, although very nearly so. Abdomen conic-ovate, a little longer than the head and thorax united, about as in *H. rhodobæni*, but the sixth and seventh segments are nearly equal in length and distinctly longer than the third and fourth segments.

♂.—Length 2.5 mm. Bronzed green; scape, tegulæ and legs, except coxæ, brownish yellow, the tibiæ and tarsi paler, nearly white; flagellum brown-black, pilose, the funicular joints cylindrical, subequal or slightly shortening towards apex, the first two or three joints about three times as long as thick; coxæ metallic green; metanotum without carinæ, the origin of the lateral folds indicated by small foveæ, but the folds not developed. Abdomen elongate or oblong, narrower, but not longer than the thorax, gradually narrowed towards base, æneous, but with a more or less well defined pale or yellowish spot on the basal one-third; the second segment is the largest, occupying about one-third the whole surface, the following segments subequal, but very slightly and gradually (almost imperceptibly) increasing in length to the seventh.

*Hab.*—Roslyn, Va.

Described from six ♀ and two ♂ specimens bred by Mr. Frank H. Chittenden, from the larvæ of *Languria mozardi* Lec. and *L. angustata* Beauv., living in the stems of wild lettuce.

## Subfamily PTEROMALINÆ.

### STICTOMISCHUS Förster.

**Stictomischus auratus** sp. n.

♀.—Length 2.25 mm. Golden-green, punctate or shagreened, the mesothorax with some sparse hairs; the sculpture resembling minute transverse wrinkles; scape, pedicel and legs, except coxæ, brownish yellow; flagellum black, pubescent, the funicle 6-jointed, the first joint the longest, about two and a half times as long as thick, the following joints very gradually shortening, the last being only about one and a half times as long as thick, the club fusiform, 3-jointed; mandibles rufous, both 3-dentate, the inner tooth broad, obtuse; clypeus separated, perfectly smooth, with a deep emargination anteriorly. Thorax with deep parapsidal furrows, the lobes convex; scutellum longer than wide, with a transverse grooved line before apex, the portion before the line closely punctate, the part behind the line with elevated lines. Wings hyaline, the veins brown, the stigmal club large, rounded, with a small uncus. Abdomen subglobose, shorter than the thorax, with the petiole longer than thick, closely, rugosely punctate, rest of abdomen smooth.

*Hab.*—Algonquin, Ill.

Described from a single specimen, taken by Dr. Wm. A. Nason, Aug. 30, 1894.

### URIELLA Ashm. n. g.

(Type *U. rufipes*)

Head transverse, wider than the thorax, the vertex medially somewhat narrowed, the frons slightly impressed, the occiput concave; ocelli on a curved line; eyes oblong oval; clypeus deeply bisinuate anteriorly; mandibles apparently 3-dentate, maxillary palpi 4-jointed; labial palpi 3-jointed; antennæ 13-jointed, with two ring-joints, inserted a little below the middle of the face; in ♀ with the flagellum subulate at tip, the funicle joints a little longer than thick, the pedicel about

as long as the first joint of funicle, or possibly slightly longer; in ♂ with the flagellum filiform, the elongate, cylindrical and pilose joints, varying in length from two to three times as long as thick, the basal joint the longest. Thorax ovoid, the pronotum not especially short, about two-thirds as long as the mesonotum, rounded off anteriorly; mesonotum about twice as wide as long, with the parapsidal furrows indicated anteriorly; scutellum convex, a little longer than wide, with a delicate transverse grooved line before the apex, the axillæ nearly as wide apart as their width at base, the postscutellum distinct and rather large, punctate, nearly as long as the apical part of the scutellum beyond the transverse suture; metanotum without spiracular sulci or carinæ, closely punctate, somewhat deeply sinuate on each side of the middle posteriorly, the spiracles small, rounded; front wings with the postmarginal and marginal veins about equal in length, the latter not quite one and a half times as long as the stigmal and much thicker at base than at apex, the stigmal vein ending in a small knob with an uncus. Legs normal, the tibial spurs 1, 1, 1. Abdomen in ♀ conic-ovate, as long as, or a little longer than the head and thorax united; the second segment, which is the longest, occupies scarcely one-third of the surface; the third segment is the shortest; the fourth and fifth longer, increasing in size, the fifth being nearly twice as long as the third, the sixth is about as long as the fourth; the seventh and eighth a little longer, the latter conical, with distinct spiracles; the tips of the ovipositor sheaths project a little beyond the eighth, while the sides of segments 4–8 are fimbriate. In the ♂ the abdomen is oblong, hardly as long as the thorax, the second segment occupying about half, or sometimes more than half of the whole surface, the three following segments subequal, the terminal segments very short.

This new genus belongs to the tribe *Merisini*, distinguished from other Pteromalids by the absence of spiracular sulci.

**Uriella rufipes** sp. n.

♀.—Length 2.5-3 mm. Head and thorax bronzy-green, closely punctate; sides of thorax and beneath, and the coxæ, blue-black. Abdomen æneous-black; scape, pedicel and legs rufous; flagellum black; tegulæ fuscous. Wings hyaline, the veins brown.

♂.—Length 1.5-2 mm. Differs from ♀ in color as follows: It is darker, or æneous-black, the thorax above with only a slight brassy tinge; the pedicel, as well as the flagellum, is black; the flagellum is filiform, pilose, the first joint the longest, about four times as long as thick, the following joints to the club gradually becoming shorter and shorter, the last being only half as long as the first, the club 3-jointed, as long as the pedicel and first funicular joint united.

*Hab.*—District of Columbia; Algonquin, Ill., and Ohio.

Described from many specimens. Dr. Wm. A. Nason has collected many specimens of this interesting species at Algonquin, and the U. S. National Museum has a single specimen labeled from Prof. F. M. Webster, bred from *Botis erectalis* Grote.

### AETROXYS Westwood.

**Aetroxys callidii** sp. n.

♀.—Length 3.5 mm. Head and thorax blue-black, above bronze-green, closely punctate and clothed with sparse white hairs. Abdomen æneous black; scape and legs, except coxæ and femora, brownish yellow, the femora metallic brown. Head transverse, wider than the thorax, not quite three and a half times as wide as thick antero-posteriorly; viewed from in front across the eyes it is wider than long, the cheeks rounded, the face below antennæ subconvex; pronotum dilated at sides, narrowed medially, the superior anterior margin acute; mesonotum a little wider than long; axillæ as wide from each other as their width at base; metanotum short, hardly half as long as the scutellum, the median carina subobsolete, the lateral folds complete, the spiracles subreniform. Wings hyaline, the veins pale yellowish, the marginal vein nearly twice as long as the stigmal, the postmarginal about two-thirds as long as the marginal. Abdomen long, conic-ovate, twice as long as the thorax, above concave, beneath convex, segments 4, 5 and 6 long, the apical margin of fourth roundedly sinuated inwardly.

*Hab.*—Virginia Beach, Va.

Described from two ♀ specimens, bred July 17, 1894, by Mr. E. A. Schwarz, from the larva of *Callidium antennatum.*

### PLATYTERMA Walker.

**Platyterma citripes** sp. n.

♀.—Length 2.5 mm. Metallic bluish green; scape, pedicel beneath and legs, except coxæ, lemon-yellow; pedicel and flagellum above brown, the latter beneath yellowish; palpi yellow. Head and thorax closely punctate, the head a little more than twice as wide as thick antero-posteriorly, viewed from in front about one-half wider than long; ocelli red; mandibles pale with black teeth; antennæ inserted below the middle of the face, 13-jointed, with three minute ring-joints, the flagellum clavate, twice as long as the scape, the pedicel obconical, a little longer than the first joint of funicle; funicle 5-jointed, the joints gradually widening toward club, all wider than long, the club incrassated, oblong. Thorax about two and a half times as long as wide, the parapsidal furrows indicated only anteriorly, the metathorax almost smooth, but with complete lateral folds. Wings hyaline, the tegulæ and veins brownish yellow, the marginal vein about twice as long as the stigmal. Abdomen viewed from above conic-ovate, the dorsum flat, beneath compressed, carinated, and with an exceedingly delicate microscopic sculpture.

*Hab.*—West Cliff, Colo.

Described from two ♀ specimens received some years ago from T. D. A. Cockerell.

**Platyterma fuscipes** sp. n.

♀.—Length 2.5 mm. Stature similar to *P. citripes*, but almost entirely blue, with only a faint greenish tinge in certain lights; the scape rufous; the flagellum,

including the pedicel black, three times as long as the scape, subclavate, the joints of funicle all longer than thick. Wings hyaline, the tegulæ and veins brown, the marginal vein one and a half times as long as the stigmal. Legs fuscous, the hind femora with a bluish tinge, the trochanters, knees and tarsi, except last joint, white. Abdomen acuminate, strongly triangularly produced beneath.

*Hab.*—Marquette, Mich.

Described from one ♀ specimen received from Mr. E. A. Schwarz.

**BELONURA** Ashm. n. g.

(Type *B. singularis*)

Head transverse, wider than the thorax, the vertex broad, the frons slightly impressed medially, the occipital foraminal depression acutely margined, the temples full; ocelli subtriangularly arranged; eyes large, subovate, bare, or with only faint traces of bristles posteriorly; clypeus not separated, anteriorly truncate, and with two minute indentations; mandibles 4-dentate; antennæ 13-jointed, with three ring-joints, the flagellum clavate, gradually incrassated towards tip, the pedicel obconical, scarcely longer than the first joint of funicle; funicle joints increasing in width, but decreasing in length, the joints 2-6 wider than long. Thorax ovate; the pronotum with the superior anterior margin acute; the mesonotum wider than long, with the parapsidal furrows distinct anteriorly to a little behind its middle; scutellum large, convex, with a delicate or subobsolete transverse grooved line just before its apex; metathorax long, punctate, produced into a subglobose neck at apex, the median and lateral carinæ distinct, the metapleural ridges fimbriate, the spiracles rather large, oval. The postmarginal vein of anterior wings is a little longer than the marginal, the stigmal very little shorter than the marginal, ending in a moderate sized knob with an uncus. Legs normal, the tibial spurs 1, 1, 1, the hind coxæ fimbriate. Abdomen elongate ovate, longer than the head and thorax united, the eighth or last segment being produced into a slender, subcompressed stylus, resembling an ovipositor; the second segment is large, and, without taking into consideration the long stylus, occupies nearly half of the whole surface; the third segment is about one-third the length of the second; the fourth, fifth and sixth united are only a little longer than the third, and of these the sixth is slightly the longest, the fifth the shortest; the seventh is longer than the sixth. Male unknown.

This new genus is remarkable for the stylus-like production of the eighth abdominal segment, which readily distinguish it from *Halizoa* Först., *Isocyrtus* Walker, *Trichoglenes* Thomson and *Trichomalus* Thoms., genera to which it seems most closely allied.

**Belonura singularis** sp. n.

♀.—Length to tip of stylus 3.5 mm. Black and rather coarsely, but closely punctate; in certain lights there is a slight æneous tinge on collar, at base of metathorax and toward tip of abdomen; scape, mandibles, trochanters, tips of tibiæ and tarsi beneath, more or less rufous or dark honey-yellow; coxæ metallic, rest of legs black. Wings subhyaline, faintly tinged, the veins piceous black; metapleural ridges fimbriate with long white hairs.

*Hab.*—Fortress Monroe, Va., and Georgia.

Described from two ♀ specimens; one in my collection taken by Mr. E. A. Schwarz, at Fortress Monroe, May 29, 1893, the other in the collection of the American Entomological Society labeled "Georgia."

## HALIZOA Förster.

**Halizoa rufipes** sp. n.

♀.—Length 3 mm. Head and thorax bronzy-black, rather coarsely punctate, sparsely pubescent; there is a golden spot just beneath the antennæ; the scape, pedicel and legs, except coxæ, are brownish yellow; the flagellum brown-black, pubescent. Wings hyaline, pubescent, the veins brown. Abdomen ovate, æneous black. Head transverse, as wide as the thorax across the shoulders, or from tegula to tegula, the frons with a slight median impression; eyes subovate, whitish and hairy, with a brownish spot anteriorly; mandibles rufous; antennæ inserted a little below the middle of the face, much incrassated toward tips, the pedicel obconical, longer than the ring-joints and first funicular joint united; funicular joints transverse, gradually widening toward club, the club oblong, obtusely rounded at tip. Thorax subovoid, the pronotum short and much narrower than the mesonotum, the superior anterior margin acute; mesonotum in outline trapezoidal, its width behind not quite twice as long as its length, the parapsidal furrows anteriorly distinct and sharply defined for two-thirds the length of the mesonotum; metathorax produced into a subglobose neck, with coarse punctures, the lateral folds and the median carina distinct, the latter, however, terminating at the subglobose neck; the superior margins of the metapleura are densely clothed with a griseous pubescence; marginal and postmarginal veins of anterior wings are a little longer than the stigmal vein. Abdomen ovate, flat above, boat-shaped beneath, the second segment (first body segment) occupying a little more than one-third its whole surface, the third and seventh segments about equal in length, but a little shorter than the fourth, fifth and sixth segments united, the latter segments being short, subequal, the last segment conical.

♂.—Length 1.6 mm. Agrees tolerably well in structural detail with the ♀, except the head and the upper surface of the thorax are bronze-green; the flagellum is subclavate, not so much incrassated as in the ♀, while the abdomen is much shorter, broadly oval or rounded, the second segment occupying fully half the whole surface.

*Hab.*—Owen's Valley, Cal.

Described from one ♂ and one ♀, specimens in National Museum, bred by Mr. Albert Koebele in May, 1891, from *Ephydra californica*.

## TRICHOGLENES Thomson.

**Trichoglenes occidentalis** sp. n.

♀.—Length 2 mm. Dull bronzy-green, closely punctate; scape, pedicel and legs, except coxæ, brownish yellow, the coxæ metallic, the femora and tibiæ, ex-

cept tips, dark brown or fuscous; flagellum incrassated towards tip, brown-black. Wings hyaline, the veins light brown. Head transverse, the vertex broad; the cheeks rather broad, rounded; eyes oval, pubescent; antennæ inserted below the middle of the face, incrassated, the pedicel much longer than any of the funicular joints, the latter transverse, increasing in width to club. Thorax subovoid, the upper anterior margin of the pronotum with a slight reflexed margin; mesonotum across the shoulders nearly twice as wide as long, a little narrowed anteriorly, the parapsidal furrows sharply indicated anteriorly for half its length or a little more; the extreme tip of scutellum and the postscutellum smooth, impunctured; metathorax produced into a small, subglobose neck, with a median carina and lateral folds, the median carina forked at apex and extending on each side of the neck intersecting with the apices of the lateral folds, the surface between the folds and the median carina as well as on each side of them, finely rugulose; the spiracles oval, away from the postscutellar ridge; the superior margins of metapleura fimbriate. Wings hyaline, the marginal vein less than twice as long as the stigmal, the postmarginal vein only a little longer than the stigmal. Abdomen rotund and not much more than half the length of the thorax, the second segment occupying fully one-half its whole surface, the following segments all very short, subequal in length.

*Hab.*—Banoff Springs and Easton, Wash.

Described from one ♀ specimen in my collection taken by Mr. E. A. Schwarz, and one ♀ in National Museum taken by Mr. Albert Koebele.

### CATOLACCUS Thomson.

**Catolaccus cœliodis** sp. n.

♀.—Length 2.75 mm. Blue-black, the face and upper part of thorax with a dull bronzy tinge, and sparsely clothed with short, scale-like, white hairs; ocelli red; palpi piceous; scape, knees, tips of tibiæ and tarsi, except last joint, honey-yellow; pedicel and flagellum black. Head and thorax punctate, the head being fully four times as wide as thick antero-posteriorly; clypeus anteriorly with a slight median sinus; antennæ subclavate, slender, the pedicel scarcely as long as the first joint of funicle, the funicular joints very gradually shortening and almost imperceptibly thickening toward the club, the first being about twice as long as thick, the last scarcely longer than wide. Thorax with the mesonotal furrows only indicated anteriorly, the pronotum exceedingly short, appearing above as a sharp, transverse line; metathorax short, scarcely half the length of the scutellum, tricarinate, the neck or produced apex of metathorax short, the median carina forked at and surrounding its base, the lateral folds strongly curved, the spiracles prominent, linear-elliptic, two and a half times as long as wide. Wings hyaline, the veins brownish, the marginal vein about two and three-fourths times as long as the stigmal, the postmarginal a little longer than the stigmal. Abdomen conic-ovate, nearly one-half longer than the head and thorax united, the second segment (first body segment) the longest, the third the shortest, the segments from the third imperceptibly increasing in length, none being very much longer than the third.

♂.—Length 2 mm. Agrees with ♀, except the head and thorax above are more distinctly bronzed, the punctuation being finer; the flagellum is shorter, only one and a half times as long as the scape, the last joint being wider than long; while the abdomen is oblong-oval, shorter than the thorax, the third and fourth segments the shortest, subequal, the fifth, the sixth and seventh being a little longer.

*Hab.*—Roslyn, Va.

Described from one ♂ and one ♀ bred by Mr. Frank H. Chittenden from the larva of a Curculionid *Cœliodes acephalus* Say.

**ENDOMYCHOBIUS** Ashm. n. g.

(Type *E. flavipes*)

Head transverse, much wider than the thorax, and rather deeply, roundedly emarginated behind, the occipital foraminal depression immargined, the frons much impressed, the vertex, therefore, acute, and antero-posteriorly thin; the face below the insertion of antennæ is rather full, convex, the cheeks long, rather flat, a little longer than the eyes; eyes rather small, obovate, bare; ocelli small, almost in a straight line, the anterior ocellus being only slightly in advance of the lateral; mandibles not large, 4-dentate; antennæ 13-jointed, with two ring-joints, inserted near the middle of the face; in ♀ subclavate, pubescent, extending to base of abdomen, the flagellum two and a half times as long as the scape; pedicel obconical, about as long as the ring-joints and the first joint of funicle united; funicle joints transverse, club-shaped, loosely joined; club fusiform, 3-jointed; in ♂ more slender, with the funicular joints less distinctly transverse. Thorax ovate, the pronotum short, rounded before, the superior margin rounded; mesonotum a little wider than long, with the parapsidal furrows only indicated anteriorly; scutellum convexly rounded with a delicate transverse grooved line just before apex on its posterior declivity; metathorax produced into a neck at apex, tricarinate, the carinæ delicate, but distinct; spiracles small, elliptic. Wings with the marginal and postmarginal veins about equal, or the latter slightly the longer, the stigmal vein slightly curved, about two-thirds the length of the marginal and terminating in a very small stigma. Legs normal, tibial spurs 1, 1, 1. Abdomen small; in ♀ rounded, scarcely half the length of the thorax, depressed above, subconvex beneath, the petiole very short, the second segment occupying not quite half the surface, the third and following segments short, subequal; in ♂ oval, the second segment a little shorter than in ♀.

This genus comes apparently nearest to *Meraporus* Walker, but is quite distinct from it in the shape of the head and in its antennal and abdominal characters.

**Endomychobius flavipes** sp. n.

♀.—Length 1 mm. Head and thorax black, or blue-black, the mesonotum and scutellum delicately reticulated, or scaly punctate, and with a decided æneous or brassy tinge; the scape, the short abdominal petiole and the legs yellowish white; flagellum light brown. Abdomen rounded, æneous-black.

♂.—Length 0.65 mm. Agrees with the ♀ in colorational detail, but differs in having a more slender flagellum and in the abdomen being oval, not rounded.

*Hab.*—District of Columbia.

Described from one ♂ and six ♀ specimens, bred by Mr. E. A. Schwarz, from the supposed larva of *Endomychus biguttatus* Say.

### SYNTOMOPUS Walker.

**Syntomopus affinis** sp. n.

♀.—Length 2.2 mm. Dull bronzed green; scape æneous, the base alone yellowish. Legs metallic, the tips of femora, anterior tibiæ, base and tips of middle and hind tibiæ, and all tarsi, except last joint, honey-yellow; flagellum brown-black, the funicular joints all wider than long; petiole shagreened, grooved at sides, the long second abdominal segment with the longitudinal median sulcus unusually large and long, extending almost to the apical margin, which has itself a deep median emargination; the following segments all short, the sheaths of the ovipositor prominent. Wings hyaline, the veins pale yellowish.

*Hab.*—District of Columbia.

This species comes very close to *S. americanus*, but the wider funicular joints metallic colored legs, the tibiæ being differently colored, and the longer median sulcus on the second abdominal segment readily separate it from that species.

### ACROCLISIS Förster.

**Acroclisis carolinensis** sp. n.

♂.—Length 2.6 mm. Dull bronze-black, the thorax beneath blue-black, the face metallic green; the head and thorax are rather coarsely, squameously punctate; scape, pedicel beneath, tegulæ, trochanters, knees, anterior tibiæ, all tarsi, except last joint and the base and apex of middle and hind tibiæ brownish yellow, the coxæ blue-black, the femora dark brown, the hind femora bronzed, the middle and hind tibiæ, except distal ends lighter brown; flagellum black, the pedicel short, scarcely half the length of the first funicular joint, the funicular joints fully twice as long as thick; ocelli red; cheeks somewhat rounded. Thorax long, the pronotum rather large, transverse-quadrate, about three times as wide as long; mesonotum with the parapsidal furrows distinct, the shoulders somewhat prominent; scutellum subconvex, with a cross-furrow before apex; metathorax long, tricarinate, punctate, the spiracles very small, rounded, away from the post-scutellar ridge, which is metallic green. Abdomen oblong-oval, the petiole longer than the hind coxæ, rugose and with four carinæ; the second segment attains to half the length of the body of the abdomen, is smooth and cupreous, with a deep emargination at base, the apical margin straight; the third segment is scarcely half the length of the second, the fourth about half the length of the third, the following all very short, but distinctly visible; segments 3-8 are bluish, with a faint microscopical reticulated sculpture. Wings hyaline, the veins light brown, the marginal and postmarginal long, nearly equal in length, the latter a little the longer, twice the length of the stigmal.

*Hab.*—Round Knob, N. C.

Described from one ♂ specimen collected June 23, 1893, by Mr. E. A. Schwarz.

### CRYPTOPRYMNUS Förster.

**Cryptoprymnus illinoensis** sp. n.

♀.—Length 1.6 mm. Head and thorax æneous-black, squameously punctate; the abdomen highly polished black, the tips clothed with sparse whitish hairs, the second segment very large, occupying most of the surface, palpi white; scape and legs, including coxæ, honey-yellow; flagellum slender, black, the first funicular

joint the longest, a little longer than the scape. Wings hyaline, pubescent, the veins brownish yellow, the postmarginal vein a little longer than the stigmal, the marginal not quite twice as long as the stigmal; hind wings with long cilia on hind margin toward base.

*Hab.*—Algonquin, Ill.

Described from one specimen received from Dr. Wm. A. Nason.

**METAPON** Walker.

**Metapon rufipes** sp. n.

♀.—Length 1.8–3 mm. Dull bronzed green to blue-black and black, closely punctate and clothed with a whitish pubescence; the abdomen æneous; scape, pedicel, ring-joints and more or less of the first joint of funicle, mandibles and legs, except coxæ, rufous or brownish yellow, the femora sometimes slightly dusky medially; flagellum strongly incrassated, brown-black. Wings hyaline, or sometimes with a slight fuscous tinge, pubescent, the tegulæ and veins ferruginous or brownish yellow, the marginal vein nearly twice as long as the stigmal: metanotum much as in *M. deiphon* Walk.—a median carina intersected at basal one-third by a transverse carina, which is usually very distinct and prominent, although sometimes nearly obsolete; the ridge of metapleura blue-black, not cupreous. Abdomen ovate, compressed, much narrower than the thorax, concave above, carinate beneath, the ventral valve very large, extending beyond the tip of abdomen, yellowish; petiole very short, rugose, the fourth segment shorter than the third, the following segments subequal.

♂.—Length 1.8-2 mm. Agrees with ♀, except in the structure of the antennæ and in the abdomen: The abdomen is oblong, with sometimes a yellowish spot at base, the second segment occupying about half its surface, the third being only half as long as the first, while the fourth and fifth segments are scarcely half as long as the third.

*Hab.*—Jacksonville, Fla.; Georgia, District of Columbia and South Dakota.

Described from several specimens. Mr. F. H. Chittenden has bred this species from *Chlamys plicata* Fabr.

**Metapon californicum** sp. n.

♀.—Length 4 mm. Bronzed green, closely, rather strongly punctate and clothed with a sparse, whitish pubescence; face black; a bright cupreous spot beneath insertion of hind wings; upper margin of metapleura clothed with dense long white hairs; scape, pedicel, ring-joints and first joint of funicle, tegulæ, the veins and the legs, except coxæ, light rufous or brownish yellow; flagellum strongly incrassated, black, the funicular joints 3–6 transverse. Wings hyaline, or faintly tinged; fourth abdominal segment longer than the third.

♂.—Length 2.5-3 mm. Differs from ♀ in the antennæ, the flagellum being filiform, about four times the length of the scape, densely pubescent, the funicle 6-jointed, the joints loosely joined, the first the longest, twice as long as the third, or as long as the club, the second nearly two-thirds the length of the first, 3–6 subequal, a little longer than thick: the femora are sometimes dusky or brown; while the abdomen is much smaller, oblong, only half as long as the thorax, the petiole about two and a half times as long as thick, smooth, shining, the second segment occupying about one-third of the surface, the third two-thirds as long as the second, the fourth about one-fifth the length of the second, the fourth about one-fifth the length of the third.

*Hab.*—Los Angeles, Cal., Riley County, Kansas, and Georgia.

Described from several specimens.

## CYRTOGASTER Walker.

**Cyrtogaster citripes** sp. n.

♂.—Length 1.6 mm. Robust, golden-green; antennæ, except a small spot on pedicel at base above and the club which are fuscous, palpi, mandibles, except teeth, and legs, except coxæ, lemon-yellow. The mesonotal furrows extend anteriorly only to the middle of the mesonotum; metanotum purplish, tricarinate, but with the surface smooth. Wings hyaline, the veins brownish yellow, the marginal vein not quite twice as long as the stigmal, the postmarginal a little shorter than the marginal. Abdomen spatulate, the petiole short, stout, rugose, with a median carina, the second segment very large, occupying most of the remaining surface, the remaining segments, except the third, which is very short, all retracted and not at all visible.

*Hab.*—Fort George, Florida.

**Cyrtogaster occidentalis** sp. n.

♀.—Length 1.5-1.7 mm. Aeneous-black, or dull bronzed green; the head in front somewhat purplish or bluish; head and thorax scaly punctate; scape and pedicel, except extreme base of the former, æneous; flagellum dark brown. Legs, except coxæ, brownish yellow. Head transverse, about four times as wide as long antero-posteriorly, the frons very wide and scarcely impressed medially; antennæ subclavate, inserted below the middle of the face on an imaginary line with the base of the eyes; pedicel a little longer than the two ring-joints and the first joint of funicle united, the funicular joints a little wider than long; mesothoracic furrows indicated only anteriorly; metanotum smooth, tricarinate, with a short raised line at base between the middle and lateral carinæ. Wings hyaline, the veins fuscous or brownish, the marginal vein not quite twice as long as the stigmal. Abdomen short, ovate, pointed at tip, the petiole about three times as long as thick, finely shagreened, with a delicate median carina, the second segment occupying one-half of the length of body of abdomen, its apical margin with a very slight median sinus; segments 3 and 4 subequal.

♂.—Length 1.25-1 5 mm. Variable from a bronze-green, through blue-green to blue-black, or even æneous-black: antennæ and legs, except coxæ, yellow, a spot on pedicel above at base and the club more or less dusky, funicular joints 1 and 2 about as long as wide, 3-6 a little wider than long; mesothoracic furrows indicated only anteriorly. Abdomen spatulate, the petiole as long as or a little longer than the hind coxæ, shagreened, the median carina wanting or distinct only at base, second segment occupies about half of the whole surface of the body, with a slight median sinus on its apical margin, third segment distinct, the following very short, usually retracted.

*Hab.*—Indiana, Texas, District of Columbia, Virginia, South Dakota and Colorado.

This species has been bred by Prof. F. M. Webster from *Oscinis variabilis* or *O. umbrosa* Loew, mining the stems of wheat.

## POLYCYRTUS Westwood.

**Polycyrtus floridanus** sp. n.

♂.—Length 2 mm. Bright metallic green, closely punctate; scape towards apex and pedicel æneous; flagellum short, light brown, the joints transverse; all coxæ and femora metallic, the knees, tibiæ and tarsi, except last joint, yellow or brownish yellow. Head transverse about four and a half times as wide as thick antero-posteriorly; antennæ unusually short, the scape extending only to the middle ocellus, while the flagellum is also short, subclavate, with transverse

joints; mesothoracic furrows complete, strongly converging to about three-fourths the lengths of the mesonotum and then with an abrupt curve towards the inner one-third of the axillæ; scutellum with an indistinct cross furrow before apex; metanotum and abdomen as in *P. trypetæ*, but with the abdominal segments relatively different: The second segment occupies more than half the whole surface, the third being one-half longer than the fourth, the fifth only one-half the length of the fourth, while the following segments are retracted.

*Hab.*—Jacksonville, Fla.

This species is markedly different from all other forms known to me in the very short antennæ, and in having metallic colored femora.

### PANSTENON Walker.

**Panstenon columbiana** sp. n.

♀.—Length 3 mm. Bluish green, punctate; collar above, lateral lobes of mesonotum, postscutellum, metanotum and base of abdomen bluish; mandibles, scape and tarsi, yellowish. Legs, except coxæ and tarsi, rufous; flagellum brown-black. Wings ample, hyaline, pubescent, the anterior pair with a dusky spot at their basal angles; tegulæ piceous; veins yellowish, the marginal vein about two-thirds the length of the submarginal, the stigmal vein about one-third the length of the marginal, ending in a small knob with an uncus, the postmarginal very long, extending to the apex of the wing; collar distinct, narrowed, campanulate; mesonotum rather flat above, with complete parapsidal furrows; scutellum flattened, the axillæ nearly their width at base from each other; metanotum long, smooth, but with a delicate median carina, the spiracles very small, rounded, remote from postscutellar ridge. Abdomen conic-ovate, as long as the head and thorax united, æneous, but with a short yellowish petiole; the second segment is the longest, the others shorter, subequal, the apical segments produced into a point.

*Hab.*—District of Columbia.

### EUCHRYSIA Westwood.

**Euchrysia hyalinipennis** sp. n.

♀.—Length 4 mm. Bronzed black, coarsely punctate and clothed with a whitish pubescence; face and sides of thorax more or less bluish green, the face with large, coarse, umbilicate punctures; antennæ black, sometimes with three or four basal joints of flagellum, brown; all tarsi brownish yellow, more or less white basally. Wings hyaline. Head transverse, the vertex acute, the face with a Λ-shaped antennal furrow, and with large, coarse, reticulated punctures; mandibles blackish; eyes large, pubescent, convergent above; antennæ 11-jointed, subclavate, the pedicel three times as long as thick at apex; funicle joints 1-4 longer than wide, the following wider than long; club globose, ending in a stylus. Thorax above depressed or flat, the parapsidal furrows delicate, but complete; scutellum large, flattened; metathorax short, with lateral folds, but no median carina, the metapleura above bright cupreous, with whitish hairs; spiracles large, oval. Legs, except tarsi, metallic; the hind femora much swollen and minutely denticulate beneath. Wings hyaline, the veins brown, the marginal vein about half the length of the submarginal, the postmarginal considerably longer than the marginal, while the stigmal is only about one-third the length of the marginal. Abdomen broadly ovate, depressed, æneous-black, with a cupreous band at base, the segments 4-6 finely transversely aciculated; the first segment occupies about one-fourth the whole surface, the second is very short, the third about twice as long as the second, the fourth a little longer than the second and third united, the fifth a little longer than the three preceding united, while the sixth is much shorter.

*Hab.*—Argus Mountains, Death Valley, Panamint Valley and Los Angeles, California; Texas and St. Louis, Mo.

Types in National Museum.

Mr. Coquillett bred a single ♀ specimen of this species at Los Angeles, Cal., from larva of *Chrysobothris delecta* Lec.

**Euchrysia maculipennis** sp. n.

♂.—Length 2 mm. Golden green, shagreened; the vertex, occiput, pedicel and sides of scutellum bluish, or with bluish reflections; a spot on metapleura smooth, violaceous; three basal joints of middle tarsi and the spur white; anterior and posterior tarsi dark brown, rest of legs metallic. Wings hyaline, with a large brownish cloud on disc below the marginal vein; hind femora much swollen and with the apical two-thirds beneath, minutely denticulate, as in *Halticella*.

*Hab.*—Santa Cruz Mountains, California.

Types in National Museum.

## Subfamily ENCYRTINÆ.

### ENCYRTUS Dalman.

**Encyrtus mesographtæ** sp. n.

♀.—Length 1.1 mm. Blue-black; mesonotum metallic purplish; scutellum cupreous. Abdomen æneous; scape and legs, except as hereafter mentioned, brownish yellow; flagellum dark brown; all coxæ metallic, the anterior femora near base, a blotch on the middle of their tibiæ above, the hind femora, except tips and the basal half of their tibiæ, brown. The funicular joints, except the first, are transverse, widening from the second, the first being a little longer than thick. Wings hyaline, the marginal vein dark brown, as long as the stigmal.

In the male the closely punctate vertex, the finely shagreened mesonotum, the scutellum and the metapleura are bright cupreous; the flagellum is filiform, brownish yellow, pilose, the joints about two and a half times as long as thick, the first joint being slightly longer; the hind femora and the tibiæ, except at base and apex, are dark fuscous; otherwise as in ♀.

*Hab.*—Jacksonville, Fla.

Described from specimens reared from the puparium of *Mesograpta polita* Say.

## Subfamily ENTEDONINÆ.

### CLOSTEROCERUS Westwood.

**Closterocerus niger** sp. n.

♂.—Length 0.8 mm. Polished black, the head sometimes with bluish metallic reflections; scape, trochanters, knees, tibiæ and tarsi, white; middle and hind tibiæ with a brownish annulus towards base; flagellum fusiform, brown-black, pilose, the funicle 3-jointed, the joints gradually increasing in size and width, dilated; club 3-jointed, the last two joints closely united. Wings clear hyaline, ciliate, the venation pale brownish. Abdomen subrotund, depressed, smooth and highly polished, the petiole short but distinct, second segment occupying most of the remaining surface, the following segments exceedingly short, more or less retracted.

*Hab.*—Algonquin, Ill.

Described from two ♂ specimens collected by Dr. Wm. A. Nason, July 25 and 31, 1894.

### SECODES Förster.

**Secodes phlœotribi** sp. n.

♀. -Length 1.5 mm. Cœruleus, the disc of mesonotum and the scutellum with an æneous tinge; coxæ and femora, except tips, bluish; scape, tips of coxæ, trochanters, tips of femora and the tibiæ and tarsi, except last joint, honey-yellow or yellowish, the tarsi a little paler or yellowish white; flagellum brown-black, subclavate, pubescent. Wings hyaline, the veins yellowish, the pubescence very fine and arranged in little irregular lines; stigmal vein very short, but terminating in rather a large oval knob. Abdomen conic-ovate, as long, or a little longer than the head and thorax united.

The ♂ is more of an æneous-black, the sides of thorax and abdomen beneath blue; the tibiæ, except distal ends, are brown, while the abdomen is oblong, narrowed towards base.

*Hab.*—Roslyn, Va,

Described from one ♂ and one ♀ bred June 18, 1894, from the larva of a beetle *Phlœotribus frontalis* Oliv.

The ♂, unfortunately, has the antennæ broken off, and these important organs, in consequence, are not described.

## Subfamily TETRASTICHINÆ.

### TETRASTICHUS Haliday.

**Tetrastichus johnsoni** sp. n.

♀.—Length 1.25 mm. Polished black, the hairs on head and thorax black; scape, trochanters, except second joint of middle legs, tips of femora and all tibiæ and tarsi, honey-yellow; flagellum black, three or more times longer than the scape, clothed with a sparse, whitish pubescence, the pedicel and first funicular joint united alone a little longer than the scape, funicular joints 2 and 3 about equal in length, a little shorter than the first, the first being the longest joint, and about four times as long as thick. Head transverse, antero-posteriorly very narrow, with a deep frontal emargination; mesonotum a little wider than long, smooth, but with deep parapsidal furrows; the collar anteriorly and at sides, episterna, anterior margin of mesopleura and the metanotum feebly shagreened, the latter short, with a median carina and distinct, rounded spiracles, which are bounded behind by a raised curved line; tegulæ piceous black. Wings hyaline, iridescent, pubescent, the marginal cilia of hind wings longer than on the anterior wings; veins brown, the submarginal vein two-thirds the length of the marginal, the former with one long bristle just before its middle. Abdomen oval, not longer than the thorax, the first body segment occupying about one-third the whole surface, all the following segments short, subequal.

*Hab.*—Urbana, Ill.

Described from six ♀ specimens bred by Mr. W. G. Johnson, July 30, 1895, from a mud wasp's nest, *Pompilus* sp.

**Tetrastichus microrhopalæ** sp. n.

♀.—Length 1-1.25 mm. Aeneous-black, the prosternum violaceous, the mesonotum, scutellum and postscutellum usually cupreous or greenish: scape and pedicel beneath light brown; flagellum subclavate, brown-black, pubescent, the funicular joints about one and a half times as long as thick, the club much stouter, ovate, 3-jointed, the joints very little longer than thick; all trochanters, the apical half of the anterior femora, tips of middle and hind femora and all tibiæ and tarsi, except last joint, pale yellowish white. Wings hyaline, the veins pale, the marginal vein one-half longer than the submarginal, or three and one-half times as long as the stigmal. Abdomen conic-ovate, as long as the head and thorax united, with metallic reflections in certain lights, more decidedly cupreous towards base.

♂.—Length 0.9 mm. Agrees with ♀, except in the antennæ and the abdomen: The scape is much shorter, the flagellum filiform, with long hairs, the joints being fully twice as long as thick, while the abdomen is oblong-oval, hardly as long as the thorax.

*Hab.*—Roslyn, Va.

Described from several specimens bred by Mr. Frank H. Chittenden from larva of a Coleopteron, *Microrhopala xerene* Newm.

**Tetrastichus chlamytis** sp. n.

♀.—Length 1-1.25 mm. Blue-black, the axillæ, scutellum and postscutellar ridge with a slight æneous tinge: pedicel æneous; flagellum brown-black, pubescent, the funicular joints a little longer than thick: knees and all tibiæ and tarsi, except last joint, brownish yellow, the trochanters sometimes, but rarely, pale at sutures. Wings hyaline, as in previous species. Abdomen conic-ovate, one-third longer than the head and thorax united.

♂.—Length 0.8 mm. Agrees with ♀, except the antennæ are entirely light brown, clothed with long hairs, the last two joints of the funicle being about twice as long as thick, the anterior joints being shorter, while the abdomen is oblong-oval, scarcely as long as the head and thorax united.

*Hab.*—Roslyn, Va.

Described from several specimens bred by Mr. Frank H. Chittenden from the cases of a Coleopteron, *Chlamys plicata* Fabr.

This species is closely allied to *T. microrhopalæ*, but is readily distinguished by color and the longer, more acute abdomen. It is probably hyperparasitic on *Metapon rufipes* Ashm. also bred from this case-bearer by Mr. Chittenden.

## ON ILLINOIS GROUSE LOCUSTS.

BY J. L. HANCOCK.

The theory of descent implies that modification of form is gradual, and that intermediate series have existed between any two forms that might be chosen. But when *existing* forms are brought together in which connecting links have perished groups can be practically separated for convenience. When two forms are in dispute specifically the definite way of determining whether they are distinct or not is to observe if they interbreed. This means, oftentimes, a long delay in confirming the validity of species after new discoveries are made. We can, in the absence of such proof, resort to the systematic study and comparison of characters. The breaking in on the attending series of evolutionary changes in nature allows, by induction, a distinction to be made of species by the exclusion of inconstant variations of structure. A large series of specimens of a common species of grouse locust will illustrate, viz.: 1. A generation of individuals closely resembling each other, but with structural peculiarities manifest as slight departures in each specimen from the parent (individual variation); 2. A group composed of examples in which slight, but similar lines of departure of structure occur (varieties); 3. Another in which analysis confirms progressive fixation of structure (insipient or sub-species); 4. Lastly, stronger though variable structural peculiarities recognizable as common characters (species). Besides, there are atavic dimorphic forms which are subordinate to species. The advent of modern discussions in evolutionary doctrines has made it particularly important to note the differences or plasticity in the organism. The contention that constant structural peculiarities be used in separating species leaves out those forms falling under the classes one to four. There has been a notable indifference to the grouping and characterization of species now in the actual process of evolving as in those outlined above. In the interest of advancing scientific knowledge their consideration is of much interest. Where mention is made of "species" is this group, the Tettigidæ, we are a good way along in permanency of characters. The great degree of variation occurring in the grouse locusts is well known. In so short

a paper we must leave the subject of the stages leading up to their origin to be considered at another time. Some earlier naturalists separated species on the ephemeral "color characters." As remarked by Uhler and more recently reaffirmed by others, they are practically of no classificatory significance. It is on the whole but proper to speak provisionally where variations are such a constituent part of the organism that we no sooner are desirous of immortalizing our *type* than forces of evolution mold or modify the characters by changing the lines of configuration in the monument raised in its behalf. Such is a picture of the Tettigidæ. Members are to be received tentatively until a careful revison is formulated after the descriptive stage has been completed in our North America forms.

With reference to the general classification of the grouse locusts, the excellent special essay by Bolivar,* aside from containing some confusing statements on North American forms already noted by Morse, is the most comprehensive work published. The absence of pulvilli between the claws, the shape of the pronotum, which extends backwards like a roof over the wings, often extending beyond the end of the abdomen and the small loboform wing covers (elytra) distinctly defines the group.

To Brunner De Wattenwyll entomological science is indebted for elevating the knowledge of the general relations of the Orthoptera to a much higher plane. In his "Revision,"† page 102, this group is placed as the first of nine tribes constituting the orthopterous division Acridiodæ. The current bibliography in America is replete with interesting papers. Especially noteworthy are articles by A. P. Morse, which, besides giving biological notes of merit, also note descriptions of new North American species. The writings of this author include a synopsis of the Tettigidæ in "Notes on the Acrididæ of New England" "Psyche," October, 1894, and a serial paper (two articles) on "New North American Tettiginæ" in March and September numbers of the journal New York Entomological Society. Jerome McNeill has contributed some valuable notes in "Indiana Orthoptera," "Psyche," 1894. W. S. Blatchley has enriched the literature in a serial paper under the title of "Indiana Acrididæ" in "Canadian Entomologist."

* Essai sur les Acridiens de la tribu des Tettigidæ (Ann. de la Soc. Entom. de Belgique, xxxi, 1887).

† Revision du systeme des Orthoperes, Genova, 1893.

The subjoined observations on Illinois grouse locusts are accompanied by original plates. Some evolutionary stages in the markings of *Tettix* are shown, and in this genus a feature is the introduction of enlarged sketches of the chephalo-dorsal outline. Over seven hundred specimens in the writer's collection formed the basis of this paper without mentioning the great store of specimens examined in the field alive, numbering into thousands. That portion of northern Illinois known as the Des Plaines, and a part of the Calumet River region in Cook County, formed the central focus of observations. So far recorded this group of locusts as found here is given in the accompanying list; a number are new. Among specimens from M. J. Elrod and Mr. Adams, of Bloomington, Ill., to whom the writer expresses obligations, there was one new slender species, described under *Tettix angustus*. A series of specimens from S. W. Blatchley, from Vigo County, Indiana, and a number from A. P. Morse, of Wellesley, Mass., furnished valuable assistance in making comparisons.

### Gen. **TETTIX** Charp.

1. **T. granulatus** Kirby (Plate VI, fig. 3, 3*a*).

Cephalo-dorsal outline as shown plate ix, fig. 28. Easily recognized by the angulate character of the vertex.* A uniformity of structure is common in specimens taken in Chicago, Riverside, and at Dune Park, Ind. Colors are extremely variable.

Length of body ♀, 15 mm.; ♂, 12 mm.

Abbreviated variety, ♀; a single specimen from Chicago and one found at Dune Park, Ind., resembles this form, excepting an abortive condition of the wings and pronotum. Wings not passing the hind femora. The vertex, while angulate, hardly advanced as far in front of the eyes. Length of body 9 mm.

2. **T. ornatus** Say (Plate VI, fig. 1, 1*a*).

Cephalo-dorsal outline as shown plate ix, fig. 29. Between this and the form *triangularis* there is no tangible specific difference. The latter is an abbreviated variety (see plate vi, fig. 2, 2*a*), and much confusion has existed respecting it. In dry open woods in upland country it often takes on the color phase, *bilineata* of Harris, plate viii, fig. 20.

Chicago, Riverside and Rivergrove, Ill.

* The Western species is *T. incurvatus* Hancock. See "American Naturalist." August, 1895, p. 761.

3. **T. angustus** sp. n. (Plate VI, fig. 4, 4*a*).—Cephalo-dorsal outline as shown plate ix, fig. 24. Allied to *ornatus:* stature slender, eyes prominent, subglobose. Head swollen about the eyes, muffled, but slightly, by the pronotum; vertex broader than an eye, subexcised a trifle in front of eyes, front margin approximately rectangular with sides of crown, the latter depressed on forward half, middle of vertex slightly carinated, barely produced; frontal costa behind antennæ rounded, advanced normally nearly as far as vertex, excavate sparingly opposite eyes; ocelli usually visible in profile at margin of deepest point; pronotum anteriorly truncate, slender, subtectiform; dorsum in front above articulation of first leg but slightly constricted, median carina slight, anterior marginal carina subparallel, short, separated hardly wider than vertex; lobes small, lower margin strongly oblique, inferior angle in profile subconvexed below, sides of pronotum gently converging as far as knee of hind femora, apical process thin, extended far backwards, nearly same thickness throughout, terminating rather acutely, not reaching the end of wings. Legs thin under margin of first, and both margins of second femur indistinctly scalloped; dorsum of pronotum nearly horizontal, surface granulated, but not as smoothly as in *ornatus* or *granulatus*. Elytra oblong, surface punctate; face smooth; carinæ of the entire body reduced generally. Length of body ♀, 14 mm.; ♂, 12 mm.; pronotum ♀, 12 mm.; ♂, 10.5 mm.; hind femora ♀, 5.5 mm.; ♂, 5 mm.

Bloomington, Ill. (M. J. Elrod), Riverside, Ill.

Abbreviated variety. ♀.—Apical process of pronotum slightly passing hind knee, not quite reaching end of wings; lobes of pronotum short, inferior angle strongly projecting laterally, obtusely pointed, sinus immediately above deep. Length of body 10 mm.

Bloomington, Ill. (M. J. Elrod).

4. **T. inflatus** sp. n. (Plate VII, fig. 8).—Cephalo dorsal outline as shown plate ix, fig. 26. Similar to *T. angustus;* stature more robust, eyes less globose and smaller. Head oblique, strongly muffled by the front antero-lateral margin of the pronotum; vertex a little wider in front, perceptibly broader behind, not excised as abruptly, projecting more in front of the eyes, carina of vertex hardly distinguishable, barely showing in front; in profile the frontal costa is more deeply and sharply excavate opposite the eyes almost to their front outline; pronotum broader, compact in front, anterior carina oblique, distance apart at the anterior dorsal margin considerably more than the front margin of vertex; dorsal surface between angles of lateral margin slightly swollen, immediately behind subdepressed, sloping gently backwards to process; median carina thin, almost obscure, apical process larger, concaved, not reaching end of wings; lobes larger, more turned out at the inferior margin; lateral carinæ in their front course sharply accentuated. Legs strong, anterior femora compressed, slightly carinated below, second femur subspatulate, distinctly carinated, both margins roughly scalloped; surface of dorsum tuberculate and granulated. Elytra elongate, punctate, sometimes slightly granulate. Length of body ♀, 12.5 mm.; ♂, 11 mm.; pronotum ♀, 12 mm.; ♂, 10 mm.; hind femora ♀, 6 mm.; ♂, 5 mm.

Riverside, Ill.

5. **T. obscurus** sp. n. (Plate VII, figs. 9, 9*a* and 10, 10*a*).—Cephalo-dorsal outline as shown plate ix, figs. 23 and 25. Differs from the foregoing, *T. inflatus*, which it most resembles, in having stature more slender, but broader than *T. angustus*. The vertex is about as wide, but the pronotum is flattened on the dorsum, and the lower margins of the lobes strongly distended laterally; surface of dorsum finely rugose. Wings overreach apical process.

5a. Plate VII, fig. 10, 10*a*.—Not quite as broad through the shoulders, about the same length, having the pronotum nearly horizontal and becoming concave posteriorly; median carina hardly raised between the shoulders, very thin, almost disappearing in its backward course to the apex; pronotum not strongly constricted, corrugations but slightly shown; dorsum not flattened quite as much; a short wing form also occurs. As stated above it is not named, pending further study. Length ♀ 10 mm.

Riverside, Ill.

6. **T. gibbosus** sp. n. (Plate VI, fig. 5, 5*a*).—Cephalo-dorsal outline as in fig. 30, plate ix. Vertex in profile produced, angulate, frontal costa excavate but little in front of the eyes, the carinated front border of face below bent forward, rather flattened at the middle, face slightly oblique, eyes prominent; from above the small mid-carina of vertex projects plainly from the middle of the excised front border; pronotum truncated in front, flattened on dorsum, the latter is broad, with a pronounced anterior dorsal hump between the shoulders, raised above level of eye; behind the hump the dorsum is sharply depressed, behind this again a much smaller protuberance, rarely a broken surface follows in profile, median carina slightly more distinct than the lateral ones; dorsum not uncommonly with transverse roughened lines; apical process not greatly lengthened, sometimes reaching beyond the wings, but oftener not passing the latter; lateral angles of dorsum strongly projecting over the tegmina; tegmina with surface punctate and granulate. Length of body ♀, 11.5 mm.; pronotum ♀, 10.5 mm.

By contrast with *granulatus* the vertex is strongly pointed, and the frontal costa is sharply excavate. The general color of specimens is often like the ground upon which they find subsistence. Special markings occurring in this species is shown in plate viii, figs. 14–20. In recent specimens a tinge of opaque green is often found with dark mottlings on the sides of the abdomen. It frequents the more shaded portion of the banks of the Des Plains River, and is found from early Spring to late Fall. Flight is not often attempted, rather preferring to hug the ground closely.

Abbreviated variety.—A slightly smaller form exists with characters nearly the same, excepting the pronotum and wings; met with in the same situations. The pronotum is not extended into such a slender point behind, the sides are more nearly straight, very frequently individuals are found with the tip of the apical process slightly decurved or distorted, and just reaching the end of the wings and posterior knee. The shortness of the body in this variety

often gives greater prominence to the dorsal hump in front as well as making the lateral angles appear stronger, giving specimens a very unique appearance.

Riverside and Rivergrove, Ill.

7. **T. fluctuosus** sp. n. (Plate VII, fig. 6, 6*a*).—Cephalo-dorsal outline as in fig. 27, plate ix. Allied to *T. gibbosus;* vertex in profile produced into a small pyriform prominence in advance of the upper part of the eyes; frontal costa deeply notched opposite the eyes; the vertex above is about equal to the combined width of the eyes, flattened and shallowly sunken in front each side of the scarcely distinguishable mid-carina, the latter just appearing at the cut-off front border; pronotum truncated in front, flattened on dorsum, rather broad with an anterior dorsal elevation between the shoulders, depressed behind, lateral angles strong, sharply carinated and projecting laterally over the base of the tegmina, lateral borders of process compressed, apical process tapering and concavely curving to the end, not reaching the end of the wings. In front the pronotum is constricted, corrugated and deeply depressed each side of the dorsal hump, formed into an angular pit pointing inward in the humeral portions; median carina not distinct, its course behind the dorsal elevation from before backwards broken by a succession of very small gradually decreasing protuberances frequently granulated upon their summits; lower border of lateral lobes diverging and rounded posteriorly below. Body covered with granulations frequently light in color interspersed with tubercles on the dorsum. Elytra oblong, granulated and punctate; angles everywhere accentuated in this form. Length of body ♀, 13 mm.; pronotum ♀, 11.5 mm.

Riverside and Rivergrove, Ill.

Here, as in most of the other forms enumerated, a short-wing form is encountered and assigned a place in plate vii, fig. 6*b*, and the cephalo-dorsal outline is figured in figure 27*a*, plate ix; vertex similar to *T. fluctuosus*. The pronotum varies extremely. A specimen which forms the basis of these remarks has the dorsal elevation gracefully molded, raised as usual, but with five granulated protuberances marking the course of the median carina of nearly equal size. The wings do not extend as far as the end of the pronotum, the latter is almost straight on the sides terminating by an acute point decurved, distorted and not reaching the posterior knee.

8. **T. decoratus** sp. n. (Plate VII, fig. 7, 7*a*).—Cephalo-dorsal outline as in fig. 31, plate ix. Nearly allied to *T. gibbosus* and *fluctuosus:* small in stature: vertex produced much like *fluctuosus*, mid-carina indistinct, scarcely to be seen at the cut-off front border; the face is proportionally large; dorsum flattened, with an anterior hump. Wings extending a little beyond the end of the pronotum; easily mistaken for *T. ornatus*, which it resembles nearly in size, but distinctly different structurally. Length of body ♀, 11 mm.

Chicago, Riverside and Rivergrove, Ill.

Abbreviated variety.—Differing only in the abortive condition of pronotum and wings, which do not pass the hind knee; ♀, 10 mm.

### Gen. **PARATETTIX** Bol.

1. **P. cucullatus** Burm. (Plate VII. fig. 11, 11*a*).

The commonest local form preferring the immediate border of streams. Chicago, Riverside and Rivergrove, Ill.

Experiment in hatching young of *Paratettix cucullatus:* Aug. 4, 1895, five or six specimens from Riverside were placed in a quart fruit jar with a little of the soil taken from the margin of the river. Contentment reigned for a few days, and in the interval they were constantly seen on the soil; copulation took place several times, then they commenced to die off one at a time, as is usually the case with this very wild species, owing to an inability to adapt themselves to close confinement. On the night of the 20th, or early morning of the 21st, dozens of newly-hatched young appeared on the bottom of the jar; a few were pale yellowish white, the rest have already taken on the warm gray color of the soil; fifty-six individuals were counted. After introducing the adult parent specimens they were not seen depositing their eggs, but conclude this was done soon after entering the jar, and sixteen days is the just estimate of the time required for the full term of incubation. August 21st, at 12.40 P.M., while looking in the jar a pale yellowish white, young, 1.5 mm. fell on the bottom; a moment later, from a crack in the side of the soil, another specimen emerged. The eyes at this early stage is reddish brown, the only visible color. Rather unsteadily it clung to the side of the earth while casting off the amnion, which, like a thin pellicle, enveloped the body. The shedding took place from the head backwards, finally adhering to the end of the abdomen for a few moments before the whole was completely discarded. Three minutes from this time the young specimen made a vigorous jump across the jar. At 5.25 P.M. the soil was searched, being carefully separated, and two masses of eggs were discovered in different situations in the soil about an inch apart. When the eggs were laid the ground was wet and soft, a little pocket was made in one case, a crack being chosen for the other in which to deposit the eggs about one-quarter inch below the surface. Two young hatched when the writer was engaged in examining the last remaining unhatched eggs with a hand magnifying-glass; an opportunity was thus

observe a few more details to the process. Eggs when first laid are a creamy white, becoming brownish with age; it is 1.5 mm. in length, cylindrical, curved a little and rounded at the ends. The anterior end is laid pointing upwards; in those at the top the extremity is provided with a little sharp point. When the young is about to make its exit a rent occurs down the middle from before backwards. In one case the insect simply raised up and backed out to extricate itself, then shedding the amnion as briefly described above. If there is ample room for the eggs as there was here, the pressure exerted within by the embryon bursts the shell at the point of least resistance along the back beginning at the anterior end, but not always with definite precision. Most of the eggs examined seemed completely divided longitudinally through the middle, while others showed that emergence had taken place from forward end, passing between the neighboring eggs up the shallow burrow. The separate masses or pods contained approximately thirty eggs each. The young take on pigment a few hours after hatching and very closely resemble each other. The progeny at this time is perfectly equipped to launch into the world about.

Young of *Paratettix* just hatched from the egg.—Pale yellowish white, length 1.5 mm. In profile head large, rather swollen, front margin convexed, summit rounded, angulate; eyes deep reddish brown situated high, the crown showing slightly in outline above; antennæ short, enlarged toward the end with ten articles; pronotum in the form of small shield about as long as the height of the head, lightly encroached on the head, cut-off in front, slightly constricted directly over the attachment of first leg showing as a slight indentation near the anterior dorsal margin; lobes rounded off below in front, deeply grooved behind, forming a sinus just above and in front of second leg; pronotum sliced and sloped thin at the sides abruptly into small posterior process slightly tilted up at the apex. The apical end passes back a third of the length of the posterior femur; median and very small lateral carina present; borders of posterior femur convexed. Abdomen extending almost to the posterior knee.

### Gen. **TETTIGIDEA** Scudd.

1. **T. acuta** Morse (Plate VII, fig. 13, 13*a*).
   Chicago and Riverside, Ill.

2. **T. parvipennis** Harris (Plate VII, fig. 12, 12*a*).
   Until recently this species was designated *T. lateralis*. Morse

(Journ. N. Y. Ent. Soc. March, 1895), after examining specimens from the Southern States, concludes that Say's species is restricted. Harris applied *parvipennis* to the short-wing variety. Abbreviated varieties of this and the foregoing species are found at Riverside. Members of the genus *Nomotettix* Morse, have not personally been taken up to the present writing.

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## EXPLANATION OF PLATES.

### PLATE VI.

Fig. 1. *Tettix ornatus*. Very much enlarged.
" 1*a*. " " Head and pronotum drawn to smaller scale.
" 2. " *triangularis* var.
" 2*a*. " " pronotum and head.
" 3. " *granulatus*.
" 3*a*. " " pronotum and head.
" 4. " *angustus* sp. n.
" 4*a*. " " " pronotum and head.
" 5. " *gibbosus* sp. n.
" 5*a*. " " " pronotum and head.

♀ sex used throughout in these and following figures. Enlarged, original from nature.

### PLATE VII.

Fig. 6. *Tettix fluctuosus* sp. n.
" 6*a*. " " " pronotum and head.
" 6*b*. " " var. n.
" 7. " *decoratus* sp. n.
" 7*a*. " " " pronotum and head.
" 8. " *inflatus* sp. n.
" 9. " *obscurus* sp. n.
" 9*a*. " " " pronotum and head.
" 10. " " var. n.
" 10*a*. " " " pronotum and head.
" 11. *Paratettix cullatus* Burm.
" 11*a*. " " " pronotum and head.
" 12. *Tettigidea parvipennis* Harris.
" 12*a*. " " " from above.
" 13. " *acuta* Morse.
" 13*a*. " " " pronotum and head.

Enlarged, original from nature.

## PLATE VIII.

Markings on the disc of pronotum of *Tettix* showing evolution of the pigmented areas. From specimens in the author's collection.

Fig. 14. Unmarked, or primitive type.
" 15. Early type of pigmentation.
" 16, 17, 18, 19. Advancing stages of pigmentation.
" 17. In this type simultaneous pigment marking in front with the spots further back.
" 20. Harris' type "*Tetrix bilineata*," a variable form of marking of *Tettix ornatus*.
" 21. Young of *Tettix*, a few days old, showing marking at *a*.
Figures drawn to uniform scale, 14-19 inclusive, from specimens of *Tettix gibbosus*. Enlarged, original from nature.

## PLATE IX.

Figs. 23-31*a*. Cephalo-dorsal outline of different forms of *Tettix* for comparison. The figures are self-explanatory, original, from nature, enlarged.

# A CLASSIFICATION OF THE GEOMETRINA OF NORTH AMERICA, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.

BY REV. GEO. D. HULST.

As the result of the work of systematists, two methods of classification are found in our lists and text books. The first is in common use in Europe, and is the system of Lederer. The second is in use in America, and is the system of Guenée. Lederer's system, published in 1853, was far in advance of anything published before him, and, as based in large part upon structure, has deserved the respect it has always received. Guenée's system was given a life on this side of the ocean by the fact that Dr. Packard, in his Monograph, closely followed it, and that Monograph has made our lists and given us our names. This system, professedly attempting to cover everything, is exact in nothing, and as a system is absolutely without worth, and, apart from Dr. Packard's following, has never had any recognition.

In 1892, Mr. Meyrick published a "Classification of the Geometrina of the European Fauna" (Trans. Ento. Soc. London, 1892, part 1, pp. 53–140), in which he endeavored to arrange the family on the basis of invariable structure. This classification does not as yet seem to be adopted, but is, in many respects by far the best yet proposed, and is the result of wide comparative study and consistent generalization. It is this system which, in the greater part, I have followed. And yet I have made in one respect at least a radical departure from it. Mr. Meyrick lays down as one of the fundamentals of his classification the following rule: "No genus, family or higher group, is tenable unless distinctly separable from all others by points of structure, which, whether singly or in conjunction, are capable of accurate definition. If a systematist is not able to define by a clear and not simply comparative character, the distinction between two genera, he is bound to merge them together." This rule is a most excellent one, but Mr. Meyrick, in his rigid and consistent application of it, gives it an interpretation not warranted in practice, for he makes not difference in structure, but difference in

structure without the known existence of intermediate forms in nature, to be the application of the rule. As a result some of his genera cover almost subfamily differences, as witness such as *Pseudopanthera* and *Crocota*. All divisions are artificial in theory, and accidental in fact, and it is more natural, and it seems to me more scientific, while using discretion, to consider wide variations in structure as valid bases for genera even though intermediate forms may exist which may be referred with equal propriety to one or to the other.

I have also given more importance to some details of structure than is given by Mr. Meyrick. As an example, my own experience leads me to regard the pencil found on the hind tibiæ of the males of many species as a thoroughly reliable point of structure. It may often be rubbed off, and the groove in which it rests be difficult to discern, but the structure is not variable in the same species.

There are other structural peculiarities which may modify classification in the future. Some of these may be found in the larval and pupal stages, but, apart from what I have noted, nothing has as yet been observed which seems reliable. A character in the imago which may be of greater importance than I have given it, is the peculiar form of the subcostal vein of hind wings near the base. Prof. Comstock, who discovered this peculiarity, makes it of family importance. My own observations lead me to believe it cannot be considered exclusive. First, it is scarcely distinct in some of the Sterrhinæ, and is wanting in some that we must consider true Geometers such as the genera *Mecoceras*, *Melanchroia*, etc., as well as some genera of the Monocteniinæ and Strophidiinæ. On the other hand the tendency to the basal angulation of the costal vein of the hind wings seems to me to be as fully developed in some of the Geometriform Noctuina, as in the Sterrhinæ and Monocteniinæ, and much more so than in some other genera. In some of the *Catocalæ* this angle is clear, though it is apt to be overlooked, as the vein is very faint, while the vein, which would be vein 9, and which is coincident with 8 just beyond base is very strong, and is ordinarily regarded as the only one.

Very considerable use may in the future be made of modifications of the antennæ, based on a form of structure, so far as I know, not hitherto observed. In the species which have the antennæ bipectinate in the males the position of the pectinations with regard to the segments upon which they stand is very different. In a very few

(*Ripula*) the antennæ are doubly bipectinate, having two pectinations at the summit and two at the base of each segment; this is also the case with the pectinate species of *Erannis*, a fact not heretofore noticed. In many species the pectinations are at the summit of the segments, and in others at the base only. This tendency is shown in the species which do not have bipectinate antennæ, as well as in the females, the tendency of the ciliations being to gather into tufts at both summit and base as in *Ectropis*, etc., or at bottom, or at top only. I have not been able to make any exclusive generalizations as yet, but the Sterrhinæ seem thus to separate from the Geometrinæ, the former having the pectinations at the bottom, the latter at the top of the segments. In the Ennominæ the species having the pectinations at the top of the segments generally correspond with those which have the fovea at the base of the fore wings in the male, but this is not always the case. A few species have the antennæ serrate, and a few others have them flattened and more or less lamellate; generally with this structure the antennæ are naked, at least below. I have found only one instance of unipectinate antennæ among our species, and this is the ♀ of *Gonodontis hypochraria* H.-Sch., but I am not sure that any emphasis can be placed upon this fact. In most species the pectinations on one side are shorter than on the other, and in this species in the female the longer pectinations have apparently just begun, or are just losing their existence, while the shorter ones have not begun, or have ceased to be.

There are also very considerable differences in the position and shape of the tibial epiphysis. In many species it is below the middle of the tibia and short. In others it is above and often reaches considerably beyond the end of the tibia; sometimes it is considerably tufted.

The tarsi vary considerably compared with the tibiæ and with each other. They are often spinulated, sometimes strongly so.

These characteristics, so far as my observations go, are comparative only. I have as yet not been able to make use of them in classification, but suggest their variability that the future student may make use of them as a larger and better study of material may warrant.

I have been able to make nothing of the ocelli; other students have seen them in a few species, but I have to confess I have never yet seen the organ developed in a single Geometer, though for the purpose of study I have bleached hundreds of heads, and in some

species for this very purpose. In a very few cases, however, I have found the minute rudiments of maxillary palpi.

I have endeavored to follow strictly the law of priority in generic and specific names, and have therefore, without hesitation, taken Hübner's genera as given in the Verzeichniss. I have not endorsed the names of the "Tentamen," as I can find nothing which shows it to be a publication. It is simply a printed letter, and can have no authority, because it was written in type. I have, however, noted where the "Tentamen" names apply, for the convenience of those who disagree with me in my opinion of their validity.

I have been unable to make very little of the genera of Guenée and Walker, based upon exotic, mostly tropical material. Their diagnoses are in the main without exact reference to structure, and I have been unable to examine their types. I have also made little use of the genera of some later writers, as the structural basis for these genera is the position of various veins which is excessively variable in the same species. The validity of these can only be determined after extensive comparison of structure in the same species, and in species nearly related.

It was the custom of the French Lepidopterists of former times to call the group the Phalænidæ, and in this Guenée was followed by Dr. Packard in his Monograph. *Phalæna*, as used by Linnaeus, is nearly equal to the Heterocera as now used. *Geometer* was the name he gave to group under consideration. Fabricius afterwards ignored this name, and called the group *Phalæna*, but it is clearly a synonym, and so neither it nor its derivitives have any standing. I have given the group superfamily standing, though the most of systematists may not agree with me. But as will be seen I give the group a wider reach than most Lepidopterists.

The Geometrina separate from other groups of the Lepidoptera as follows: The antennæ are never club shaped or fusiform, and they are thus distinguished from the Rhopalocera, Sphingina, and some other groups. The larva have one or more pairs of the anterior abdominal legs wanting, and they are thus distinguished from the Bombycina in the widest reach of that term; vein 5 of the fore wings is from or near the centre of the outer margin of the cell, and they are thus distinguished from the Noctuina. There are only one or two internal veins to the hind wings, and thus, as well as by the peculiarity of the larvæ, they are separated from the Microlepidoptera. In my judgment their nearest relatives are the Noctuina,

though in this opinion I have the sympathy of very few, if, indeed, of any other Lepidopterists.

## GEOMETRINA.

Synopsis of families and subfamilies.

Hind wings vein 5 present, strong..... ..... GEOMETRIDÆ.
Hind wings vein 5 absent, or a fold only..... .....ENNOMIDÆ.

### GEOMETRIDÆ.

1. All wings with vein 5 nearer 6 than 4.....GEOMETRINÆ.
   Fore or hind wings with vein 5 at middle of cell, or nearer 4 than 6.....2.
2. Hind wings vein 8 coalescing with cell to middle, or if separate, joined with it by a cross-bar at or beyond middle.....3.
   Hind wings vein 8 separate from cell or joined at or near base only.....4.
3. Frenulum present.....HYDRIOMINÆ.
   Frenulum absent.....DYSPTERIDINÆ.
4. Hind wings 8 shortly joined with cell at or near base.....5.
   Hind wings 8 separate from cell.....6.
5. Hind wings joined with cell near base, shortly, then rapidly diverging.
   STERRHINÆ.
   Hind wings 8 joined with cell at base, then subparallel with it.
   MONOCTENIINÆ.
6. Fore wings 7 separate from both 8 and 9.....7.
   Fore wings 7 stemmed with 8 and 9.....BREPHINÆ.
7. Fore wings 8 stemmed with 9.....STROPHIDIINÆ.
   Fore wings 9 separate from 8.....LEUCULINÆ.

### ENNOMIDÆ.

1. Hind wings 8 coalescing with cell at base.....FERNALDELLINÆ.
   Hind wings 8 separate from cell.....2.
2. Frenulum present.....3.
   Frenulum absent.....PALYADINÆ.
3. Antennæ and legs very long; antennæ three-fourths length of fore wings.
   MECOCERATINÆ.
   Antennæ and legs normal; antennæ never more than two-thirds length of fore wings.....4.
4. Fore wings 7 separate from 8 and 9.....MELANCHROIINÆ.
   Fore wings 7 stemmed with 8 and 9.....ENNOMINÆ.

### DYSPTERIDINÆ.

The Dyspteridinæ, with the Hydriominæ, are easily separated from the rest of the Geometrina by the coalescing of vein 8 of the hind wings with the cell for half or more of its length, or in exceptional cases in both subfamilies, where 8 does not coalesce with the cell, it is joined by a cross-vein to the cell at or beyond its middle. In both subfamilies vein 5 of the hind wings is developed. The two

subfamilies are very closely related, and the absence of the frenulum merely marks the completion of a tendency shown very distinctly in the nearly allied genera of the Hydriominæ, such as on the one hand *Lobophora*, *Trichopteryx*, etc., and on the other *Alsophila*, *Paleacrita* and *Eudule*.

## DYSPTERIDINÆ.

### Synopsis of Genera.

1. Antennæ of ♂ bipectinate.....1. **Dyspteris.**
   Antennæ of ♂ not bipectinate.....2.
2. Hind wings of ♀ partly or not at all developed.....3.
   Hind wings of ♀ developed as in ♂.....5.
3. Hind wings of ♀ obsolete.....7. **Rachela.**
   Hind wings of ♀ partly developed, about as long as thorax.....4.
4. Tongue present, though weak.....5. **Opheroptera.**
   Tongue obsolete.....6. **Paraptera.**
5. Fore wings with one accessory cell.....2. **Cysteopteryx.**
   Fore wings with two accessory cells.....6.
6. Hind tibiæ of ♂ with hair pencil.....3. **Nyctobia.**
   Hind tibiæ of ♂ without pencil.....4. **Cladara.**

### 1. DYSPTERIS Hübn.

Verz. 286, 1818.

Type *D. amata* Cr.

Palpi short; clypeus not tufted; antennæ bipectinate in ♂, simple in ♀; thorax and abdomen untufted; hind tibiæ with all spurs in both sexes; fore wings broad, even, inner margin short, 12 veins, 11 on 10, with one accessory cell; hind wings 8 not anastomosing with cell, but joined in both sexes with it by a cross-vein beyond middle; hind wings of ♂ with vitreous spot along inner margin near base; frenulum wanting; venation of ♂ very much distorted, the cell being very much shortened and drawn in, and veins 1, 2 and 3 obsolete. In ♀ 2 and 3 are present, 4 widely separate from 5, 6 and 7 stemmed.

This genus has heretofore been catalogued with the "Greens" so-called, but beyond question it has no affinities with them.

Species.—*D. abortivaria* H.-Sch.

### 2. CYSTEOPTERYX n. gen.

Type *viridata* Grt.

Palpi short, porrect, quite heavily scaled; front flattened; antennæ ciliate in both sexes; fore tibiæ unarmed; hind tibiæ with end pair of spurs only, without hair pencil in ♂; thorax and abdomen untufted; fore wings 12 veins, one accessory cell, 6 stemmed with 7;

hind wings 8 with cell more than half its length; in ♂ there is a lobe at base along inner margin folded over upwards forming a sort of pocket; frenulum wanting.

Differs from *Trichopteryx* in having only one accessory cell, and from *Philopsia* in that only one pair of spurs is present on hind tibiæ, and from both in the absence of the frenulum.

Species.— *C. viridata* Grt.

### 3. **NYCTOBIA** n. gen.

Type *limitata* Wlk.

Palpi moderate, erect; front not tufted; antennæ filiform, ciliate in both sexes; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with end spurs only; in ♂ there is a slight pencil of long hairs on inner side; fore wings 12 veins, two accessory cells, 6 and 7 stemmed; hind wings 8 with cell to beyond middle, 6 separate from 7; in ♂ there is a folded lobe at base on inner margin above; frenulum wanting.

The hair pencil on the hind tibiæ of ♂ is rarely met with in this section of the Geometers. Mr. Meyrick does not consider it a generic character, regarding it as variable and uncertain, but after much comparison my own opinion is, it can be fully relied upon, and is a most excellent limitation. By this *Nyctobia* is separated from *Lobophora* Curt., as well as by the absence of the frenulum.

Species.—*N. limitata* Wlk.
*N. fusifasciata* Wlk.

### 4. **CLADARA** n. gen.

Type *atroliturata* Walk.

Palpi short, porrect, rough scaled; tongue developed; front smooth; antennæ of ♂ filiform; thorax and abdomen smooth; hind tibiæ with one pair of spurs in both sexes, without hair pencil; fore wings with two accessory cells, 12 veins, 6 with 7; hind wings with folded lobe at base above along inner margin in ♂; 8 veins, 6 and 7 separate, 8 with cell to beyond middle; frenulum wanting.

Differs from *Nyctobia* in the absence of the hair pencil on hind tibiæ of ♂; from *Trichopteryx* Hubn. in that 8 is joined with cell in hind wings; from *Lobophora* Curt. in that it has one pair of spurs on hind tibiæ. From both the latter as well in the absence of the frenulum.

Species.— *C. atroliturata* Walk.

### 5. **OPHEROPTERA** Hübn.

Verz. 321, 1818.

Type *brumata* L.

Palpi short, porrect, slender; antennæ of ♂ dentate, with fascicles of hairs on each segment; antennæ of ♀ filiform; front smooth; tongue short, weak; hind tibiæ with all spurs; fore wings of ♂ 12 veins, one accessory cell, 6 long stemmed with 7, accessory cell large, 7, 8, 9 and 10 arising from at or near its end; hind wings 8 veins, 3 and 4 widely separate, 5 nearer 4 than 6, 6 and 7 long stemmed, 8 with cell to beyond middle; wings of ♀ partly developed extending about length of thorax; body of ♀ somewhat vermiform; frenulum wanting.

It is doubtful whether this species has even been taken within our limits. I have never seen it myself to be certain of it, but Staudinger catalogues it, doubtfully from Greenland.

Species. — *O. boreata* Hübn.

### 6. **PARAPTERA** n. gen.

Type *danbyi* Hulst.

Tongue wanting; palpi short, slender; antennæ of ♂ with segments round, even, each with two slender fascicles of hairs; ♀ antennæ filiform; clypeus untufted; thorax and abdomen untufted, in ♀ more closely joined, somewhat vermiform; hind tibiæ with one pair of spurs only, or very rarely with upper pair slightly developed; fore wings of ♂ 12 veins, with one accessory cell, 5 nearer 4 than middle of cell, 6 long stemmed with 7, cell large, 1*a* and 1*b* both present, strong; hind wings 5 much nearer 4 than middle of cell, 6 and 7 long stemmed, 8 with cell more than half its length; ♀ with wings partly aborted, these reaching somewhat beyond thorax, and being about the size of the ordinary wings on emergence from pupa; frenulum wanting.

Very close to *Opheroptera*, differing in tongue, antennæ of ♂, and spurs of hind tibiæ, though in none of these in a very marked degree.

Species.—*P. danbyi* Hulst, n. sp.

**P. danbyi** n. sp. ♂ expands 36–40 mm.—Palpi fuscous gray above, edged with gray to light gray beneath: clypeus smoky black: antennæ fuscous, lighter towards end; thorax blackish, with a lining to collar, patagiæ and posterior portion of light gray. Abdomen light gray with a fuscous shade sprinkled with a few black scales, and with a shade of yellowish on anterior segment. Wings crossed by a number of evenly separated wavy black lines, the darker or lighter

interspaces forming bands, and these colors in general alternating, the extreme base being lighter, and the two at the middle of the wing being also lighter, but separated by a black line with a blackish outer shading; the bands beyond middle become a little broader at costa, so that they become finally parallel with outer margin, the submarginal one being narrow, forming a distinct denticulate white line; other specimens have thorax, abdomen and wings darker, the lighter spaces being gray and the darker grayish black; there is also some variation in the width of the bands, which, from the extreme base, are nine in number; the veins forming the discal cell are somewhat emphasized by blackish, which is more prominent on the median. Hind wings with lines corresponding to the fore wings, but less distinct, becoming obsolete towards base, and with interspaces more uniform light fuscous, except that the lines have a dark outer shading.

Female varying in colors of thorax and abdomen from light gray to dark fuscous, the thorax being the darker, at times almost blackish, and the abdomen sometimes annulate with gray. Wings gray, with a deep black band beyond middle.

Described from four males and five females, one pair sent by Prof. Fletcher, the rest from Mr. W. H. Danby, all of these taken by Mr. Danby at Victoria, Brit. Col., from early in November to about middle of December. The females seem to vary considerably in size, some being hardly larger than the ♀ of *Rachela bruceata*, while others are almost as large as the ♀ of *Erannis tiliaria*. The specific name is given in honor of its discoverer, Mr. Danby.

### 7 **RACHELA** n. gen.

Type *bruceata* Hulst.

Palpi small, slender; tongue wanting; clypeus rather broad, scaled; antennæ ♂ even, each segment with two fascicles of hairs on each side; thorax and abdomen untufted; hind tibiæ with two pairs of spurs; antennæ of ♀ filiform, very slightly pubescent; thorax and abdomen of ♀ closely joined, somewhat vermiform; fore wings ♂ broad, even, 12 veined, 1*a* and 1*b* present, strong, 3 widely separate from 4, 5 nearer 4 than 6, 6 long stemmed with 7, 10 on 11 anastomosing with 9 forming a long accessory cell, 11 from cell, 12 free; hind wings 8 veins, 1*a* and 1*b* present, strong, 3 and 4 widely separate, 6 and 7 long stemmed, 8 anastomosing with cell to beyond middle; wings of ♂ almost entirely lacking.

Name given in honor of Mrs. Rachel Bruce, whose husband, Mr. David Bruce, han done so much towards a knowledge of the Lepidoptera of the central Rocky Mountain region, and to whom I am indebted for many favors.

Species.—*R. bruceata* Hulst.
*R. hyperborea* Hulst, n. sp.
*R. occidentalis* Hulst, n. sp.
*R. latipennis* Hulst, n. sp.

**R. occidentalis** n. sp.—Expands 32-34 mm.

I give this name to an insect of which I have received many specimens from Victoria, Brit. Col. It is very uniform in appearance, and without doubt nearly related to *R. bruceata*. It is, however, in the ♂ uniformly darker on all wings, and the fore wings have the apex more rounded and the inner margin shorter. The inner angle is thus broader and the wing more oval in shape. The ♀ is blackish gray instead of fuscous.

**R. latipennis** n. sp.—Expands 28 mm.

I give this name to a species received from California, of which I have no females. The wings are much broader than in *R. bruceata* or *latipennis*, and the apex much less extended. It has much the same markings as *bruceata*, but they are more decided in color the lines of the hind wings being especially pronounced. In general appearance it approaches *Opheroptera brumata* of Europe.

**R. hyperborea** n. sp.—Expands 23 mm. Very much in appearance like *R. latipennis*, with narrower wings, the two outer lines quite distinct, the central band obsolete, and the vestiture more hairy, and uniformly of very much smaller size.

I suspect this may be a subarctic form of *R. bruceata*. My specimens of *R. hyperborea* are all from Alaska, and are very uniform in size and appearance, and are all smaller than any specimen of *R. bruceata* I have ever seen.

## HYDRIOMINÆ.

The Hydriominæ are, with the Dyspteridinæ, in the main very easily and clearly distinguished by the peculiar anastomosing of vein 8 of the hind wings with the cell. The exceptions, where the vein is separate, but joined by a cross-bar beyond the middle of the cell are peculiar, but can in no wise be made another subfamily as the females are normal. As noticed by Mr. Meyrick the most of the species with this peculiar structure have the inner margin in the ♂ with a fold or pocket, and the anterior part seems to be broadened and the anterior veins separated as a compensation.

A second exception which, as has been seen, I have made a subfamily is in the case of a few genera where the frenulum is wanting. This I have called the Dyspteridinæ, from *Dyspteris*, the typical genus.

Another exception which I have placed with the Geometrinæ is a genus of the "greens" which differs from this subfamily and agrees

with the Geometrinæ in the position of vein 5 in the fore and hind wings, as well as in other very important particulars. A final exception is *Fernaldella*, which is immediately distinguished by the absence of vein 5 in the hind wings, thus belonging to the Ennomidæ.

The venation of one genus (*Zenophleps*) is very peculiar, 6 and 7 being stemmed and separate from 8 in the fore wings. It is close to the European genus *Cataclysme* Hb., and I agree with Mr. Meyrick its appearance is due to the obsolescence of the posterior wall of the second accessory cell. It might very properly be made the basis of a separate subfamily.

In the Hydriominæ the tongue is with rare exceptions present. In the fore wings there is generally one inner vein 3 and 4 are separate, and 12 is free. The position and relations of veins 9, 10, 11 and 12 are very uniform and unvarying. In the hind wings 3 and 4 are generally separate, and 6 and 7 stemmed. In the description of genera the general form is understood, unless otherwise noted.

## HYDRIOMINÆ.

### Synopsis of Genera.

1. Fore wings 6 and 7 stemmed separate from 8.....28. **Zenophleps.**
   Fore wings 7 stemmed with 8.....2
2. Fore wings 11 veins.....22. **Catoclothis.**
   Fore wings 12 veins.....3
3. Hind tibiæ with end spurs only.....4
   Hind tibiæ with middle spurs also.....6.
4. Fore wings with one accessory cell.....14. **Gymnoscelis.**
   Fore wings with two accessory cells.....5.
5. Fore tibiæ clawed.....8. **Scelidacantha.**
   Fore tibiæ not clawed.....6. **Agia.**
6. Fore wings with one accessory cell.....7.
   Fore wings with two accessory cells.....18
7. Antennæ of ♂ bipectinate.....8.
   Antennæ of ♂ not bipectinate.....10.
8. Vestiture of wings hairy.....39. **Psychophora.**
   Vestiture of wings scaly.....9.
9. Palpi moderate, scarcely beyond head.....17. **Venusia.**
   Palpi long, much beyond head.....43. **Loxifidonia.**
10. Hind wings of ♂ with lobe at base on inner margin.....5. **Philopsia.**
    Hind wings of ♂ without lobe at base on inner margin.....11.
11. ♀ with wings partly or not at all developed.....12.
    ♀ with wings developed.....13.
12. Segments of abdomen spined.....1. **Paleacrita.**
    Segments of abdomen not spined.....2. **Alsophila.**
13. Clypeus flat.....14.
    Clypeus more or less rounded.....15.

14. Vestiture of wings hairy, thin.....3. **Eudule.**
Vestiture of wings scaly, normal.....18. **Euchœca.**
15. Abdomen with all segments tufted dorsally.....16.
Abdomen not with all segments tufted dorsally.....17.
16. Fore wings 11 anastomosing with 12.....13. **Chloroclystis.**
Fore wings 11 separate from 12.....15. **Tephroclytia.**
17. Palpi long; antennæ of ♂ serrate.....38. **Eurhinosea.**
Palpi moderate; antennæ of ♂ filiform.....27. **Plemyria.**
18. Antennæ of ♂ bipectinate.....19.
Antennæ of ♂ not bipectinate.....22.
19. Fore wings with hair pencil below near base.....26. **Neolexia.**
Fore wings without hair pencil below near base.....20.
20. Palpi long.....21.
Palpi moderate or short.....42. **Xanthorhoë.**
21. Hind wings 6 and 7 separate.....24. **Phylace.**
Hind wings 6 and 7 stemmed.....41. **Erzephila.**
22. Hind wings 8 not coalescing with cell, but joined with it by a cross-vein at middle or beyond, at least in ♂.....23.
Hind wings 8 with cell to middle or beyond.....24.
23. Hind wings of ♂ with vitreous spot on inner margin above; palpi erect. 10. **Nanuia.**
Hind wings without vitreous spot; palpi porrect....11. **Heterophleps.**
24. Fore tibiæ clawed at end.....25.
Fore tibiæ not clawed at end.....26.
25. Fore wings of ♂ with fold and pocket on inner margin beneath. 4. **Eucestia.**
Fore wings of ♂ without fold or pocket.....36. **Marmopteryx.**
26. Hind wings of ♂ with pocket or fold on inner margin.....27.
Hind wings of ♂ without pocket or fold on inner margin.....30.
27. Hind wings of ♂ with fold forming pocket.....9. **Carsia.**
Hind wings of ♂ with fold only.....28.
28. Hind wings of ♂ with fold at base, with hair tuft beneath.....29.
Hind wings of ♂ with fold at base, without hair tuft beneath. 7. **Talledega.**
29. Abdomen of ♂ with lateral tufts at end.....20. **Coryphista.**
Abdomen of ♂ without lateral tufts at end.....21. **Calocalpe.**
30. Thorax and front very hairy.....40. **Trichochlamys.**
Thorax and front scaly.....31.
31. Fore wings of ♂ with hair pencil below near base.....25. **Eustroma.**
Fore wings of ♂ without hair pencil below near base.....32.
32. Anal claspers of ♂ large, exserted.....23. **Philereme.**
Anal claspers of ♂ normal.....33.
33. Front flat.....19. **Asthena.**
Front more or less rounded.....34.
34. Hind wings 3 and 4 stemmed.....12. **Nycteroseia.**
Hind wings 3 and 4 separate.....35.
35. Thorax, abdomen and wings very closely short scaled.35. **Melanoptilon.**
Thorax, abdomen and wings normal.....36.
36. All segments of abdomen tufted dorsally.....16. **Eucymatoge.**
One or two basal or generally no segments of the abdomen tufted.....37.

37. Antennæ of ♂ serrate ..... 38.
Antennæ of ♂ not serrate ..... 39.
38. Antennæ of ♂ with fascicles of hairs on each segment.. 37. **Gypsochroa.**
Antennæ of ♂ ciliate ..... 29. **Enchoria.**
39. All wings scalloped on outer margins ..... 33. **Triphosa.**
All wings even, or hind wings only wavy ..... 40.
40. Antennæ of ♂ flattened ..... 41.
Antennæ of ♂ not flattened ..... 42.
41. Thorax tufted posteriorly ..... 32. **Hydriomena.**
Thorax not tufted posteriorly ..... 34. **Cœnocalpe.**
42. Antennæ of ♂ with fascicles of hairs on each segment.
30. **Perenoptilota.**
Antennæ of ♂ ciliate ..... 31. **Mesoleuca.**

### 1. **PALEACRITA** Riley.

Trans. Acad. Sci. St. Louis, iii, 273. 1875.

Type *vernata* Harr.

Tongue wanting; palpi very short; clypeus very broad, untufted, scaled; antennæ of ♂ with segments swollen, obtusely or bluntly dentate, with a fascicle of hairs on each protuberance; those of ♀ ciliate filiform; thorax of ♂ with low posterior tuft, ♀ untufted. Abdomen untufted, in both sexes with segments armed with two rows of spines turned backward, somewhat curved. In ♀ thorax and abdomen enlarged, scarcely separated, somewhat vermiform; fore tibiæ unarmed, hind tibiæ with two pairs of spurs; fore wings of ♂ 12 veins, vein 1 with long furcation at base, discal cell long, 6 widely separate from 7, 10 and 11 from cell, accessory cell large; hind wings 8 veins, 3 widely separate from 4, 5 much nearer 4 than middle of cell being in this respect quite noctuiform, 6 and 7 separate, 8 anastomosing with cell to beyond middle; ♀ wingless; larva with 10 legs.

The genus is remarkable for the spinulation of the abdomen in which respect it agrees with only one or two genera in the Ennominæ. It is closely allied to *Alsophila* Hüb.

Species.—*P. vernata* Harr.

### 2. **ALSOPHILA** Hüb.

Verz. 320, 1818.

Type *æscularia* Schif.

*Anisopteryx* Steph., Cat. 116, 1829, type *æscularia* Schif.

Palpi very short, slender; tongue wanting; front broad, smooth; antennæ subdentate, with a fascicle of hairs on summit of each dentation; thorax and abdomen untufted, in ♀ closely joined somewhat

vermiform; hind tibiæ with all spurs; fore wings of ♂ 12 veins, two strong inner veins, 3 and 4 widely separate, cell large; hind wings 8 veins, 3 and 4 widely separate, 5 at middle of cell, 6 and 7 stemmed, 8 with cell to beyond middle; wings of ♀ nearly or quite wanting; larva 12 legs.

Mr. Meyrick calls this genus *Erannis* Hüb., but it seems to me incorrectly. Hübner's genus *Erannis* has four species under it, three of which, and these are the first in order, are congeneric, and therefore typical of the genus, and there can be no question this was his intention. *Defoliaria* is the type species; another genus of Hübner, *Alsophila*, has as its type *æscularia* Schif., and this is congeneric with the fourth species under *Erannis*. There can be no doubt as to the application and limitations of the two terms. Latreille applied the name *Hybernia* to Hübner's *Erannis*, but it is a synonym only. Stephens, in his catalogue of British insects, applied *Erannis* to that to which Hübner gave the name *Alsophila*, and this has made confusion. But both of Hübner's genera must stand as there is no doubt concerning his meaning, *Hybernia* Latr. being a synonym of *Erannis* and *Anisopteryx* Steph. being a synonym of *Alsophila*.

I cannot agree with Mr. Meyrick in his reference of this genus to the Monocteniinæ. The most characteristic venation is the merging of vein 8 of hind wings with the cell. If this is to be ignored, the lack of the accessory cell would be no more reason why it should be placed with the Monocteniinæ than with the Ennominæ. If its place be not here, as I have no doubt it is, then in view of its various resemblances to *Erannis* in Hübner's sense, it ought to go with the Ennominæ.

Species.—*A. pometaria* Peck.

### 3. EUDULE Hüb.

Zutr. ii, p. 14, n. 127.

*Ameria* Walk., C. B. M. pt. 2, 554.
*Euphanessa* Pack., Proc. Ent. Soc. Phil. iii, 102. Type *mendica* Wlk.

Palpi short, slender, long haired below; tongue developed; front flat, smooth; antennæ of ♂ closely filiform. Abdomen slightly tufted at end; hind tibiæ with all spurs. Wings broad, even, semi-hyaline, vestiture thin and hairy; fore wings 12 veins, one accessory cell very large, 6 stemmed with 7, 8, 9 and 10 from a point, or nearly so; hind wings 8 veins 3 and 4 widely separate, 6 and 7 stemmed, 8 with cell nearly its whole length.

Species:—*E. mendica* Walk.
*E. meridiana* Slosson.
*E. unicolor* Robs.
*E. texana* French.

### 4. **EUCESTIA** Hüb.

Verz. 322, 1818.

Type *spartiata* Fuesl.

*Lithostege* Hüb., Verz. 337, 1818, type *duplicata* Hüb.
*Aplocera* Steph., Cat. 141, 1829, type *plagiata* L.
*Anaitis* Dup., Hist. Nat. viii, 350, 1829, type *plagiata* L.
*Chesias* Dup., Hist. Nat. viii, 497, 1829, type *spartiata* Fues.

Palpi moderate, heavily scaled, porrect; clypeus rounded, prominent; antennæ ciliate in both sexes; thorax and abdomen untufted; fore tibiæ with a stout claw, tibiæ short, stout; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells, 6 and 7 stemmed; hind wing 8 with cell more than half its length; in the ♂ there is a transparent fovea near base along inner margin beneath, bordered by a membraneous ridge forming a sort of pocket.

Species.—*E. rotundata* Pack.

### 5. **PHILOPSIA** n. gen.

Type *nivigerata* Walk.

Palpi short, somewhat drooping; front flattened, smooth; antennæ flattened, simple, minutely pubescent; thorax and abdomen untufted; fore tibiæ unarmed, hind tibiæ with all spurs; fore wings 12 veins, one accessory cell, 6 short stemmed with 7; hind wings 8 with cell more than half its length, the wings in ♂ with a lobe at base along inner margin; this lobe joined at base is separate from the main wing towards its end, and 3 and 4 are widely separate, as are 6 and 7; in ♀ 3 is close to 4, 6 and 7 separate.

Differs from *Trichopteryx* Hüb. in having only one accessory cell, and in the fact that it has two pairs of spurs on hind tibiæ. In the former respect it also differs from *Lobophora* Curt.

Species.—*P. nivigerata* Wlk. (inæqualiata *Pk.*)

### 6. **AGIA** n. gen.

Type *eborata* Hulst.

Palpi moderate, ascending; front smooth; antennæ filiform, ciliate in both sexes; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with end spurs only, and in ♂ with hair pencil; fore wings 12 veins, two accessory cells, 6 and 7 stemmed; hind wings 8

with cell to beyond middle, 6 separate from 7; in ♂ there is a folded lobe at base on inner margin above; frenulum present.

Very close to *Nyctobia*, differing mostly in the presence of the frenulum. It is separated from *Lobophora* in having only one pair of spurs on hind tibiæ of ♂. From *Talledega* it differs in having a hair pencil on hind tibiæ of ♂.

Species.—*A. eborata* Hulst, n. sp.

**A. eborata** n. sp.—Expands 25 mm. Palpi long, slender, drooping, black, a few white scales on extreme tip; front fuscous gray; thorax ocher fuscous, bitufted posteriorly on each side dorsum, each tuft black in front. Abdomen blackish gray, interlined, the first segment nearly black; fore wings whitish ocher, a black basal line angulated at cell; a broad median blackish band consisting of black scales irregularly mixed with scales of ground color, somewhat definitely limited on either side by black lines which are not continuous; inner line dentate, marked outwardly with jet-black dashes on veins; outer line scalloped, marked inwardly by jet-black dashes on veins, separated from corresponding dashes of median line by a central cross-line of ground color not sharply defined; the ground color divides the outer line at base of veins 3 and 4, forming a deep narrow sinus; the ground color also prevails narrowly behind subcostal vein; two submarginal lines of black dots one on each vein, the whole space clouded with blackish scales; hind wings even fuscous, with a faint extra discal darker line, edged outwardly with lighter fuscous; beneath fuscous, somewhat clouded, an outer lighter band parallel with margin showing on fore wings, and an extra discal darker band showing on hind wings.

Mitchell County, North Carolina, July, from Mr. Philip Laurent.

### 7. TALLEDEGA n. gen.

Type *montanata* Pack.

Palpi short, porrect, or drooping; front flat, short scaled; antennæ filiform pubescent; thorax untufted. Abdomen with slight tufts on segments; fore tibiæ unarmed, hind tibiæ with two pairs of spurs, without hair pencil; fore wings 12 veins, two accessory cells, 6 scarcely stemmed with 7; hind wings 8 veins, the inner margin in the ♂ being folded over above, and this fold separated from wing to base forming thus a detached piece over the posterior part of the wing; venation consequently distorted; 8 joined near base to cell, and coincident to beyond middle.

Very like *Lobophora* Curt., differing in the absence of hair pencil on hind tibiæ of ♂.

Species.—*T. montanata* Pack.
*T. tabulata* Hulst, n. sp.

**T. tabulata** n. sp.—Expands 28 mm. About the size, and wings about the shape of *T. montanata* Pack., to which, in appearance, it is closely related; palpi, head and thorax blackish gray. Abdomen more fuscous; fore wings of a light

clear gray, peppered with black atoms basally and along costa; three subquadrate blackish costal blotches not sharply defined, basal, central and outwardly in the places corresponding to the cross-lines of *L. montanata*; these are not followed by any indications of cross-lines or of rows of spots across the wings; discal spots large, black, distinct, lengthened as in *L. montanata*; hind wings even, glistening white, with dark discal spots; beneath light bright gray, the markings of the fore wings faintly showing.

Alert Island, Alaska. Differing from *T. montanata* mostly in the decided difference of the ground color, the lack of black dots on the veins of fore wings, and the lack of the lines or rows of dots across the fore wings. The lobe on the hind wings of the ♂ is also somewhat different in structure.

### 8. **SCELIDACANTHA** n. gen.

Type *triseriata* Pack.

Palpi moderately long, ascending, heavily scaled; clypeus scale tufted, rounded, projected forward below; antennæ simple, flattened, finely and evenly pubescent below; thorax and abdomen untufted; fore tibiæ short, armed at end with prominent claw; hind tibiæ with one pair of spurs; fore wings two accessory cells, 12 veins, 6 short stemmed with 7; hind wings vein 1 wanting, its place being taken by a basal lobe beneath, 3 and 4 separate, 6 and 7 stemmed, 8 starting wide from cell, joining it one-third out, then coincident with it nearly to end.

Differs from *Eucestia* Hüb. in having one pair of spurs on hind tibiæ.

Species.—*S. triseriata* Pack.
*S. virginata* Graef.

### 9. **CARSIA** Hüb.

Verz. 336, 1818.

Type *paludata* Thun.

*Larissa* Curt., Brit. Ent. vii, 324, 1830, type *paludata* Thun.
*Celma* Steph., Ills. iii, 242, 1831, type *paludata* Thun.

Palpi moderate, porrect; front somewhat prominent; antennæ filiform, ciliate in both sexes; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings with cell to beyond middle; in ♂ with a transparent fovea near base along inner margin, bordered with a membraneous ridge forming a pocket, 6 and 7 stemmed.

Species.—*C. paludata* Thun.

### 10. **NANNIA** n. gen.

Type *refusata* Wlk.

Palpi erect; front flat, short scaled; antennæ in ♂ fasciculate pubescent; thorax and abdomen untufted; fore wings broad, rounded, 12 veins, two accessory cells; hind wings 8 joined with cell by cross-vein beyond middle in both sexes, 6 and 7 stemmed; in ♂ there is a fovea beneath along inner margin, about one-third out from base; fore tibiæ unarmed; hind tibiæ with all spurs and without hair pencil.

Near *Heterophleps* H.-Sch., but sufficiently distinct in the erect palpi and the presence of the fovea in hind wings of ♂.

Species.—*N. refusata* Wlk. (harveiata *Pk.*)
*N. morensata* Hulst, n. sp.

**N. morensata** n. sp.—Expands 30 mm. Palpi and front dark sordid fuscous; antennæ a little lighter; thorax same color as front, but with ends of patagiæ lighter, becoming almost dull white at extremities. Abdomen dark fuscous, but clearer in color, segments edged with somewhat light color; fore wings sordid fuscous, unevenly and irregularly broken with lighter shadings, which can be traced as indistinct indeterminate broadish cross-lines, the outer one most apparent, yet very indeterminate, well out towards the margin and parallel with the outer edge of the wing; marginal space and base more solidly of the ground color; fringe of the color of the outer part of the wing at base becoming whitish at outside; hind wings a little lighter than fore wings, of the same obscure, somewhat broken fuscous, somewhat darker outwardly, with a darker marginal line; fringes as on fore wings; beneath on all wings lighter and clearer, more even in color, darker outwardly, with the extreme edge lighter and ochreous shaded, this color showing along costa and on apical space of fore wings.

One ♀, Wisconsin, from Mr. F. Rauterberg.

### 11. **HETEROPHLEPS** H.-Sch.

Auseur. Schmet. p. 80, 1855.

Type *triguttata* H.-Sch.

Palpi short, fine, porrect; tongue strong; clypeus fine scaled, slightly bulging; antennæ of ♂ with two fascicles of hairs on each segment; thorax and abdomen untufted; fore wings 12 veins, two accessory cells, 6 separate from 7; hind wings ♂ 6 veins, 1 and 2 wanting, 6 widely separate from 7, inner margin of wing with the edge folded over upwards without vitreous fovea; in ♀ 8 veins, 6 and 7 close together, the wings without fold; in both sexes 8 not anastomosing with cell, but joined beyond middle with a cross-vein.

Species.—*H. triguttaria* H.-Sch.

### 12. **NYCTEROSEA** n. gen.

Type *brunneipennis* Hulst.

Palpi moderately long, porrect or drooping; antennæ simple, with fascicles of hairs two on each segment. Abdomen with segments tufted. Legs rather long, hind tibiæ with two pairs of spurs; fore wings 12 veins, two accessory cells, 6 short stemmed with 7; hind wings small, 8 veins, cell rather short, 3 and 4 stemmed, 6 and 7 stemmed, 8 with cell nearly its whole length.

Species.—*N. brunneipennis* Hulst, n. sp.

**N. brunneipennis** n. sp.—Expands 27 mm. Palpi, head and antennæ fuscous; thorax and abdomen ochreous fuscous, the ochreous tint more decided on the abdomen; fore wings ochreous brown crossed by a number of mostly subparallel wavy cross-lines; two of these are near the base, another about one-third out, and following this on middle field two separate at costa and narrowing towards inner margin, whose undulations are opposite to each other; these inclose a blackish spot irregular in outline, extending from costa to below submedian vein, and again appears in a rounded blackish spot near inner margin; after two faint scalloped lines is one darker, more sharply outlined, the line being more emphasized below middle, and there at veins 3, 4 and 5 followed by faint whitish spots; the brown of the wings is also more decided in this part of the wings; faint marginal shadings with a blackish subapical cloud running inwardly and posteriorly, this having on its outer margin two or three faint whitish spots; hind wings concolorous with fore wings, but lighter anteriorly and basally, with two faint blackish middle cross-lines; another still further out edged with whitish, and a row of faint whitish spots in the brownish submarginal space; a marginal broken black line on all wings; beneath very much as above, but the central cloud of fore wings wanting and the cross-lines more indistinct or lost altogether, except the outer central one on both wings.

One ♂, Alameda County, California. By Dr. C. V. Riley from the U. S. Museum collection.

### 13. **CHLOROCLYSTIS** Hüb.

Verz. 323, 1818.

Type *coronata* Hüb.

Palpi moderate, porrect; tongue developed; front with short tuft of scales; antennæ of ♂ filiform, ciliate; thorax smooth. Abdomen with tuft dorsally on each segment; hind tibiæ with two pairs of spurs; fore wings one accessory cell, 12 veins, 11 anastomosing with 12; hind wings 6 and 7 stemmed, 8 with cell to beyond middle.

Differs from *Tephroclystis* (*Eupithecia*) in that vein 11 of fore wings coalesces with 12.

Species.—*C. inconspicua* Hulst, n. sp.

**C. inconspicua** n. sp.—Expands 22 mm. Head, thorax and abdomen dull dark fuscous, fifth segment of abdomen with black tuft. Wings somewhat extended, hind wings scalloped: fore wings with basal geminate line beginning at costa one-quarter out, and rounding to inner margin at base; an outer heavier, geminate, black wavy line beginning three-quarters out, running to inner margin a little more inwardly than line of outer margin of wings, its largest bend being just beyond discal spot, which is round, black, distinct: a marginal row of black dots: hind wings with two faint outer lines: marginal line black, fine; discal spot almost obsolete; beneath fuscous overlaid with a powdering of darker fuscous scales.

California. I have the ♀ only.

### 14. GYMNOCELIS Mab.

Ann. Soc. France, p. 77, 1869.

Type *pumilata* Hüb.

*Pasiphila* Meyr., Trans. Ent. Soc. London, pt. 3, 191, 1888, type *lepta* Meyr.

Palpi moderate, porrect; antennæ of ♂ filiform, ciliate; tongue developed; front with cone of scales; thorax smooth. Abdomen with dorsal tufts on each segment; hind tibiæ in both sexes with end pair of spurs only; fore wings 12 veins, one accessory cell, 11 sometimes anastomosing with 12; hind wings 6 and 7 stemmed, 8 with cell to beyond middle.

Differs from *Tephroclystis* in that there is but one pair of spurs on the hind tibiæ.

Species.—*G. inferior* Hulst, n. sp.
*G. gypsata* Grt.
*G. desperata* Hulst, n. sp.
*G. minuta* Hulst, n. sp.

**G. inferior** n. sp.—Expands 20 mm. Palpi rather short, stout, dark fuscous: thorax and abdomen dark fuscous, basal segment of abdomen blackish; fore and hind wings even dark fuscous with a slight brownish tint; fore wings with a basal rounded black line, a geminate discal line bent sharply at and including discal spot, with an inward angle at submedian vein, then with another bend around to margin, an extra discal line beginning at costa just beyond discal spot, making an angle a little less than a right angle beyond discal spot, thence in a straight line to inner margin; an outer submarginal shade: hind wings with two faint extra discal, dark, rounded lines; discal spots dark, not distinct; marginal lines broken, black; beneath even dark smoky fuscous, the hind wings showing somewhat darker on basal half.

California. From Hy. Edwards.

**G. desperata** n. sp.—Expands 17-19 mm. Palpi medium long, heavy, blackish; front dark gray, black below, conical tufted; thorax black by collar, otherwise light gray. Abdomen gray, second basal segment blackish; fore wings whitish, costal edge blackish, more pronounced at beginning of cross-lines: two

subobsolete basal lines: an even, broad, black line reaching from costa outward nearly to discal spot, then turning back at an angle a little more acute than a right angle, straight to inner margin; a faint line bending just beyond and around discal spot; an outer well-marked black line; outer space broken, dark fuscous; hind wings with black band of fore wings extended close to base across the wing meeting the black second segment of abdomen; outer lines also present to correspond with fore wings; all discal spots and marginal lines distinct black; beneath more fuscous, the middle band absent, the outer lines showing.

Blanco County, Texas, October.

**G. minuta** n. sp.—Expands 15–17 mm. Palpi rather short, quite stout, dark gray; front blackish or dark gray above and below, white in middle; thorax and abdomen light gray, the latter blackish gray on second segment; fore wings rather extended, light gray or whitish, darkened with bluish or dark fuscous scales showing especially on outer middle and marginal spaces forming between them a light cross-line, often indistinct, forming nearly a right angle beyond discal spot and running thence straight to inner margin; marginal line fine, black; discal spot black, distinct; hind wings whitish, cross-lines very faintly indicated a little darker along inner margin; marginal line black; discal spots not very distinct; beneath light cinereous, slightly shaded with darker color.

Argus Mountains, California, April. From Dr. C. V. Riley.

### 15. **TEPHROCLYSTIS** Hüb.

Verz. 323, 1818.

Type *pusillata* Fab.

*Dyscymatoge* Hüb., Verz. 324, 1818, type *innotata* Hüfn.

*Tarachia* Hüb., Verz. 324, 1818, type *castigata* Hüb.

*Arcyonia* Hüb., Verz. 335, 1818, type *venosata* Fab.

*Leucocora* Hüb., Verz. 325, 1818, type *succenturiata* L.

*Eupithecia* Curt., Brit. Ent. ii, 64, 1825, type *linariata* Fab.

Palpi short to long, slender to heavy, porrect or drooping; front not strongly tufted; antennæ filiform, ciliate in both sexes; thorax untufted. Abdomen with tuft on each segment dorsally; fore tibiæ unarmed, hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings 8 with cell to beyond middle, 6 and 7 separate or stemmed.

A large genus as defined, consisting mostly of small species. The species so gradually merge into one another in structure, and are so largely midway between the extremes that I have not attempted any closer limitations, and so do not give a more exact generic diagnosis.

Species:—

*T. misturata* Hulst, n. sp.
*T. nebulosa* Hulst, n. sp.
*T. scriptaria* H.-Sch.
*T. implicata* Wlk.
*T. luteata* Pack.
*T. hyperboreata* Stgr.
*T. edna* Hulst, n. sp.
*T. ornata* Hulst, n. sp.
*T. miserulata* Grt.
*T. interrupto-fasciata* Pack.
*T. leucata* Hulst, n. sp.
*T. inornata* Hulst, n. sp.
*T. albicapitata* Pack.
*T. rotundopennata* Pack.
*T. annulata* Hulst, n. sp.
*T. flaviguttu* Hulst, n. sp.
*T. coloradensis* Hulst, n. sp.
*T. sierræ* Hulst, n. sp.
*T. cretata* Hulst, n. sp.
*T. absynthiata* L.
*T. fumosa* Hulst, n. sp.
*T. longipalpata* Pack.
*T. mæstosa* Hulst, n. sp.
*T. nimbicolor* Hulst, n. sp.
*T. zygædenata* Pack.
*T. nimbosa* Hulst, n. sp.
*T. longidens* Hulst, n. sp.
*T. multistrigata* Hulst, n. sp.
*T. multiscripta* Hulst, n. sp.
*T. stellata* Hulst, n. sp.
*T. obscurior* Hulst, n. sp.
*T bivittata* Hulst, n. sp.
*T. behrensata* Pack.
*T. unicolor* Hulst, n. sp.
*T. subapicata* Guen.
*T. cestata* Hulst, n. sp.
*T. nevadata* Pack.
*T. implorata* Hulst, n. sp.
*T. raveocostaliata* Pack.

**T. misturata** n. sp.—Expands 16-18 mm. Palpi medium long, rather heavy, dark fuscous; front, thorax and abdomen fuscous gray; fore wings rather narrow, dark fuscous gray; an indistinct blackish rounded band within discal spot, and a faint blackish line rounded beyond it, this sometimes showing in blackish spots only on veins; discal spots black, distinct; hind wings a little lighter than fore wings, darker outwardly, a faint dark line beyond discal spot and another submarginally; beneath dark fuscous, the outer lines showing on all wings, the basal lines of fore wings showing by spots on costa.

Soda Springs, California, in August and September, from Dr. Behrens; also from Hot Springs, New Mexico, in September.

**T. nebulosa** n. sp.—Expands 18 mm. Palpi with black and fuscous scales intermixed; thorax dark fuscous. Abdomen blackish, interlined with blackish gray; fore wings rather narrow, rounded at apex, dark fuscous gray, slightly frosted, with very faint indications of cross-lines on median field, a faint, slightly lighter bent band beyond discal spot, and a faint whitish marginal line showing mostly in a lightening of the veins; hind wings color of fore wings, lighter basally, inner margin checkered with beginnings of otherwise obsolete lines; discal spots on all wings distinct, black, rather large; beneath lighter in color, with dark cross-lines quite distinct, especially at beginning on costa, the extra discal forming a large black spot on costa; all discal spots enlarged, somewhat diffuse.

New York, New Jersey, Texas. The Texas specimens taken in April and May.

**T. edna** n. sp.—Expands 20-22 mm. Palpi, front, thorax and abdomen clear black, slightly mixed with gray scales. Wings light gray, much overlaid

with blackish, rounded, with inner lighter line; the band is broad, rounded at disc, nearly the same width across the wing; outer space blackish, with lighter included scalloped line; marginal line black; hind wings with extra discal black line, strongly bent beyond discal spot; outer margin blackish, discal spots black, distinct on both wings, though less conspicuous in the blackish band of fore wings: beneath with markings above shadowed; hind wings white, with rounded black line beyond disc and along margin.

Glenwood Springs, Colorado. From Dr. Barnes, taken August 18th; also from Mr. Bruce.

**T. ornata** n. sp.—Expands 18-22 mm. Very much in appearance in some specimens as *T. edna* Hulst. Palpi, however, very long, beak-like, while in *edna* they are moderate; outer line of median field rounded, wavy, while in *edna* it is much straighter; middle field generally not strongly marked with black, while in *edna* it is strongly marked and often a broad black band.

The two species both vary very considerably in depth of color and to some extent in the direction of the outer lines, but are easily distinguished by the difference in the length of the palpi.

Colorado, Mr. Bruce; also from Dr. Barnes from Glenwood Springs, Colorado; taken in August.

**T. lineata** n. sp.—Expands 20 mm. Palpi middling long, ocher fuscous; front tufted, clay-white: thorax and abdomen ocher white, with a considerable fuscous stain; all wings nearly uniform dull white, with numerous cross-lines, mostly made up of black dots on veins, these showing in lengthened black spots along costa of fore wings, seven or eight in number, three being much larger and more distinct than the others, and all these being at the beginning of cross-lines and more or less evident across the wings; discal spot of fore wings black, distinct, margin with an ocher tinge; marginal line of black dashes; beneath as above, but less distinct.

Montana, Colorado.

**T. inornata** n. sp.—Expands 17 mm. Palpi short, slender, fuscous; front and thorax fuscous. Abdomen gray, slightly fuscous, somewhat ochreous at extremity; all wings somewhat silvery white; fore wings shaded with fuscous on basal half and along costa: about six heavier shadings along costa, the beginnings of otherwise obsolete bands; hind wings shaded with brown fuscous cloudings forming indistinct cross-bands; discal spots wanting; beneath whitish, both wings shaded with fuscous cloudings and the costa of fore wings narrowly black on basal third; discal spots obsolete.

Mitchell County, North Carolina, July 7th. From Mr. Laurent.

**T. annulata** n. sp.—Expands 22 24 mm. Palpi fuscous ochreous; thorax and abdomen dark fuscous; fore wings fuscous brown; all veins brokenly and finely lined with black, annulate, heavier on the inner side; outer space darker, enclosing lighter scalloped line, parallel with outer margin; hind wings light fuscous at base, darker towards outer margin, anal veins slightly lined with black; beneath dark fuscous, with brownish tinge; all wings darker outwardly; discal spots distinct.

Exact locality unknown, but probably from California.

**T. flaviguttæ** n. sp.—Expands 24 mm. Palpi short, blackish; front blackish; front of thorax blackish; patagiæ and posterior part violet-ocher to violet. Abdomen with basal segment ocher, then blackish, at extremity becoming violet-ocher. Wings rather extended, fuscous, lines scarcely evident, except double outer line, which is quite clear, rounded beyond discal spot; beyond this at veins 3 and 4 is a large ocherous spot reaching to outer margin, and above this an oblique spot of same color running somewhat narrowly from about vein 5 to outer margin just below apex, both spots faintly violet shaded; the base of the wing has also a violet-ocher color, as have faintly the ends of the veins along outer margin; hind wings fuscous, darker outwardly; all discal spots black, distinct; beneath much as above, without ocher or violet color, more leaden; hind wings with two outer rows of black dots on veins.

Colorado. From Mr. Bruce.

**T. coloradensis** n. sp.—Expands 24-26 mm. Palpi and front dark fuscous; thorax fuscous anteriorly, gray posteriorly. Abdomen fuscous, tufts and last segment blackish; fore wings fuscous, strongly washed with ochreous brown, especially within submarginal space; a rather broad, heavy, dark, rounded line close to base, a broad line at discal spot, distinct at costa including and angulated at discal spot, lost before reaching inner margin, extra discal shadings beyond following the same course, the ocher-brown becoming somewhat reddish brown near marginal space, which is darkly shaded, broadest at apex and narrowing to a line at anal angle; marginal line black, broken at veins; hind wings fuscous gray, faintly shaded in darker scalloped lines, the outer margin somewhat rounded in beneath anterior angle; beneath more indistinct than above on fore wings, the ocher and brown nearly lost, the hind wings light gray with three quite distinct cross-lines, intra discal, extra discal and submarginal; margin of all wings blackish, separated by veins.

Colorado. From Mr. E. L. Graef.

**T. sierræ** n. sp.—Expands 24 mm. Palpi blackish fuscous; front dark fuscous gray; thorax dark fuscous, with a yellowish tinge; fore wings fuscous with scattered black scales, with ocher shading subcostally, apically and within outer line on middle of wing; basal line wavy, indeterminate, consisting apparently of several parallel lines, making together a faint band much darker at costa; costal space blackish fuscous, broken, darkest basally; outer line showing in a lighter broad line edged on both sides with blackish points and atoms, angulated inwardly, then outwardly below costa, then parallel with outer margin, the blackish edgings being much emphasized at costa making a blackish patch; marginal line black; fringe interrupted, blackish; apex blackish; hind wings fuscous with scattered black scales, more numerous outwardly, giving darker shading and showing shadowy lines; inner margin broken, blackish; marginal line black; discal spots distinct, black, those on fore wings especially so, and the scales somewhat enlarged and raised; beneath as above, more fuscous, lines fainter, without ocher shading.

Colorado. From Mr. Bruce. Near *T. coloradensis*, which it much resembles.

**T. cretata** n. sp.—Expands 22 mm. Palpi gray, short; front gray; collar black; thorax and abdomen ocher-gray. Wings broad, whitish, overlaid with fuscous, the lighter color showing in lines, and all somewhat washed with ochreous; the basal whitish line well out, wavy, rounded; two blackish wavy lines on median field, the inner passing through discal spot; an outer light line, evenly rounded from costa to vein 2, then bent to margin; the marginal space blackish, broadest towards apex; discal spots black; hind wings corresponding, but basal and median portions lighter; lines very indistinct, discal spots not strong; beneath as above, without ochreous tint, and the dark colors more lead like.

Colorado. From Mr. Bruce.

**T. fumosa** n. sp.—Expands 18-24 mm. Of a uniform even dark fuscous color, the cross-lines of the wings only faintly, if at all, showing. Wings broad, rounded; discal spots of fore wings round, large, prominent, black; four black spots on costa of fore wings, each one the beginning of a fine black cross-line, the two outer being subparallel and just beyond discal spot; a lighter submarginal line, indistinct, somewhat clearer in a spot at anal angle; hind wings with faint median and submarginal lines: beneath color as above, darker in median and submarginal bands on all wings; very close in appearance to duller specimens of *T. absynthiata* L., but distinct in the long, almost tufted palpi.

South Abington, Mass., Brockport, N. Y.

**T. maestosa** n. sp.—Expands 24 mm. Palpi long, somewhat drooping, light gray; front gray, somewhat tufted, black below: thorax dark fuscous. Abdomen nearly black. Wings fuscous gray, overlaid with fuscous, the ground color showing in the cross-lines; lines many, more distinct than usual, the basal median and outer showing most plainly; the basal narrow, running out from costa to subcostal vein, then turning back at a right angle straight to inner margin just out from base; the median of the same shape, passing through discal spot and reaching inner margin one-half out; the outer with a deep rounded sinus from costa, rounding backward, then at a sharp angle turning parallel with outer margin to inner margin, wavy in its course; hind wings with a double wavy black line beyond middle, and another margined, all more distinct than usual; discal spots of fore wings large, distinct, black; beneath nearly uniform dark fuscous.

Colorado. From Mr. Bruce.

**T. nimbicolor** n. sp.—Expands 23 mm. Palpi of moderate length, heavily haired, blackish, with gray at end of longer scales: front blackish; antennæ dull fuscous; thorax and abdomen blackish gray, the abdomen interlined with black. Wings very uniform blackish fuscous, blackish cross-lines very faintly showing, the costa and outer margin of fore wings being somewhat darker than rest of wing; hind wings uniform, all wings with marginal black line evident; beneath very much as above.

Calgarry, Canada. From Mr. Wolley-Dod.

**T. nimbosa** n. sp.—Expands 24-26 mm. Palpi short, not heavy, light fuscous to fuscous; thorax, abdomen and wings light fuscous, the fore wings and hind wings outwardly with shadings of dark fuscous; fore wings with fine blackish basal line, a fine intra discal line and a corresponding geminate line

enclosing slightly lighter color beyond, bending around discal spot, and somewhat angulated below costa, an outer corresponding geminate line subparallel, reaching inner margin just within angle; a submarginal waved line not very distinct; discal spots distinct, black; hind wings with indications of lines along inner margin, sometimes in part showing across wing.

Arizona, California, the latter taken in July.

**T. longidens** n. sp.—Expands 22-24 mm. An insect of the size and very much the appearance of *T. multistrigata*. The palpi, however, are long, reaching far beyond the head, and the fore wings have the middle black line running from costa out to discal spot, there turning at an abrupt angle backward and running in nearly a straight line back to inner margin just beyond base; the discal spots are prominent, black; the hind wings have an extra discal distinct median line, rather evenly rounded, and followed by another submarginal, and still another marginal; beneath the wings are more distinctly marked in dark bands than usual, the rounded intra discal, extra discal and marginal bands standing out clearly on all wings, with distinct black, rather large discal spots.

Colorado. From Mr. Bruce.

**T. multistrigata** n. sp.—Expands 24 mm. Palpi small, gray; front, thorax and abdomen light gray, the latter with a lateral black line, the segments interlined with blackish, except on dorsum; fore wings light cinereous, marked over with blackish scales; a faint geminate basal cross-line, another intra discal, a third extra discal with strong angle beyond discal spot; outer geminate line with a sharp angle inward at cell, then turned back at a sharp angle at vein 6, thence nearly straight to inner margin, outer submarginal fine whitish line following the same course, but with a sharp inter angle just before reaching inner margin; discal spots nearly or quite obsolete, showing clearly in a white bordering lunule; hind wings light cinereous, darker, with black scales outwardly and along inner margin with beginnings of two geminate cross-lines; discal spots obsolete; marginal lines of black dashes, almost or quite continuous in places; beneath reproducing the lines above more indistinctly.

Glenwood Springs, Colorado, August 18. From Mr. Barnes.

**T. multiscripta** n. sp.—Expands 34 mm. An insect very much in appearance like *T. multistrigata*, differing among other things as follows: The insect is much larger, and is as large as any American species; the palpi are considerably longer; the body is less sharply checkered with black and gray; the lines of the wings are generally more sharply distinct, the submarginal line being without the prominent inner dentation near anal angle; the fore wings are more pointed, and the hind wings less evenly rounded, in this species the anal angle being quite well marked, and the outer margin being slightly bent in before it.

Colorado. From Mr. Bruce and Dr. Barnes, the specimens of the latter taken in May.

**T. stellata** n. sp.—Expands 24 mm. Palpi, thorax and abdomen dark fuscous, the latter with dull reddish spots dorsally, one on each segment; fore wings reddish brown, basal space along costa to cell black, ending outwardly in a black angulate cross-line; a middle field of black covering discal spot broad at costa,

rapidly converging to behind cell, then continued narrowly almost brokenly to vein 1, then broadening to inner margin; on costa the shape to narrowest part is triangular, and on inner margin subtriangular: faintly lighter lines on each side the blackish space, a wavy submarginal lighter line: hind wings fuscous, lighter at middle and base, irregularly clouded outwardly and along inner margin; beneath as above, but more indistinct, the costa of fore wings being black from base to beyond middle field.

Colorado.

**T. obscurior** n. sp.—Expands 26-30 mm. Palpi, thorax and abdomen fuscous black; palpi short, slender; fore wings blackish fuscous or brownish, tinted with faint geminate lines; outer line more distinct, especially at costa, sometimes light across the wing: it turns at nearly a right angle outward at cell, then rounds opposite discal spot in nearly a straight line to inner margin; the submedian is black lined from base to middle: the submarginal line is very faint; hind wings with blackish marginal space and broken blackish inner margin; beneath nearly even blackish fuscous, with black spots along costa.

California, Colorado.

**T. bivittata** n. sp.—Expands 26 mm. Palpi ocher fuscous; thorax, clypeus and abdomen dark fuscous: fore wings rather dark fuscous, slightly ocher tinged, unicolorous or faintly mottled, being slightly darker on veins, the indications of obsolete cross-lines; discal spots distinct, black, round; a whitish longitudinal dash on both sides; two outer marginal lighter lines very faint, running parallel with outer margin continuing to costa just within apex; hind wings light fuscous at base, darker outwardly and along inner margin, a number of dark lines soon obsolete showing along inner margin; marginal lines in both wings black; beneath as above, less uniform, a dark outer line showing on fore wings rounded somewhat at costa; hind wings with faint outer cross-line: marginal lines black; discal spots distinct on all wings.

Mendocino, Cal., June.

**T. unicolor** n. sp.—Expands 26-28 mm. Palpi fuscous; head, thorax and abdomen fuscous, with a violet-red tinge: all wings of same color, evenly frosted; fore wings with a blackish basal line making a right angle at cell; an interdiscal line corresponding in color and direction, a little more distinct; a corresponding outer line with a deep outer sinus beyond discal spot, these two outer lines continued on hind wings; discal spots of all wings black, not very distinct; beneath light fuscous, discal spots and outer line showing more broadly than above.

Colorado and California.

**T. cestata** n. sp.—Expanse 28-30 mm. Palpi blackish or dark gray whitish at end; face black below, whitish above; thorax gray or whitish. Abdomen dark fuscous, intermixed with gray scales and ringed with lighter color; fore wings light gray, overlaid on all edges with fuscous black, sometimes with a brownish tinge: this color following the costa from base, becoming a large triangular spot at discal point and enlarging to another smaller triangular spot near apex; on outer margin it is obsolete below apex, then at middle becomes a large rounded spot, with another at anal angle, these sometimes continuously joined as

a marginal band; the dark color is broad along inner margin, especially centrally, almost reaching the costal triangle; discal spots black, linear; hind wings gray, overlaid outwardly with blackish, and along inner margin to base; beneath ground color as above, and with much the same dark markings, except along inner margin of fore wings.

California, very much like *T. nevadata* Pack., differing principally in the color. It may be a variety of that species.

**T. implorata** n. sp. - Expands 26 mm. Palpi short, rather slender, fuscous; front light fuscous; thorax gray. Abdomen dark gray, ochreous at end; fore wings light gray or whitish, frosted, blackish in broken spots along costa, a patch near apex being largest, somewhat brownish along inner margin, a black basal cross-line, one geminate intra discal black line angulated outward on cell and submedian vein, an outer black line distinct at costa, marked on veins posteriorly; all veins lined with black on middle field, vein 2 heavier than the rest; discal spot long, reaching along outer margin of cell, made of longer, somewhat raised scales; marginal line heavy, black, somewhat broken; hind wings long, narrow, light gray, blackish on anal margin; discal spot black, brownish tinted at extreme edge; beneath faintly shadowing the surface above, the hind wings with outward dotted cross-line.

California.

### 16. EUCYMATOGE Hüb.

Verz. 325, 1818.

Type *togata* Hüb.

*Hypepirritis* Hüb., Verz. 329, 1818, type *impurata* Hüb.
*Orthonana* Hüb., Verz. 331, 1818, type *vitalbata* Hüb.
*Horisma* Hüb., Verz. 331, 1818, type *tersata* Hüb.
*Phibalapteryx* Steph., Cat. 138, 1829, type *tersata* Hüb.

Palpi moderate, scaled, porrect; tongue developed; clypeus with small scale tuft; antennæ filiform, ciliate in both sexes; thorax untufted. Abdomen with scale tuft dorsally on each segment; hind tibiæ with all spurs present; fore wings often narrow, extended, 12 veined, two accessory cells; hind wings 8 veins, 3 and 4 separate, 6 and 7 separate or stemmed, 8 anastomosing with cell to beyond middle.

Species.—*E. tenuata* Hulst.
*E. gelidata* Moesch.
*E. anticaria* Wlk. (strattonata *Pack.*)
*E. graefii* Hulst, n. sp.
*E. grandis* Hulst, n. sp.
*E. intestinata* Guen.
*E. vitalbata* Hüb.

I add *E. vitalbata* to our list as I have lately received specimens from F. H. Wolley-Dod taken at Calgarry, Canada.

**E. graefii** n. sp.—Expands 25–28 mm. Palpi rather long, gray or blackish gray; front strongly tufted, light gray or fuscous; thorax fuscous. Abdomen gray or fuscous; fore wings fuscous gray or gray, crossed by many wavy, or in most instances very indistinct and indeterminate lines; the most prominent in most cases are one close to base rounded dentate: a second intra discal with an angle at subcostal and at vein 1*a*, and a third extra discal straight or slightly concave from costa obliquely outward to between veins 5 and 6 there angled, and then waved dentate, parallel with outer margin across the wing; the outer space is more shaded than the middle and has a generally well marked, light, scalloped, submarginal line; discal spot large, distinct, blackish, oval; hind wings fuscous gray, faintly indicating wavy cross-lines; discal spot dark, indistinct; margins of all wings black, broken at ends of veins; beneath lighter than above, silky, with blackish along costa of fore wings, and the upper lines very faintly if at all showing.

Mt. Hood, Washington. From Mr. E. L. Graef.

**E. grandis** n. sp.—Expands 28 mm. Palpi rather long, fuscous ocher; front light fuscous, tufted; thorax fuscous, with an ocher tinge. Abdomen the same color, with the tufts blackish; fore wings base fuscous ocher, edged outwardly with a fine rounded black line; beyond this to outer line the wing is lighter, showing whitish at beginning, centrally within discal spot in a waved double cross-line, and also in a double line at end of middle space, these lighter lines separated by fine dark lines; outer line running obliquely outward to between 6 and 7, then turning at a right angle and following margin in quite even scallops; outer space darker, especially within apex, and towards costa between the outer line and a scalloped submarginal whitish line which runs parallel with outer margin; margin darkly shaded on either side of ends of veins; hind wings even, light fuscous gray, margin dark shaded on either side of veins; beneath even light silky fuscous, darker and more ochreous on outer space.

Washington.

### 17. **VENUSIA** Curt.

Type *cambrica* Curt.

Palpi rather short, somewhat recurved, scaled; tongue developed; clypeus scaled, smooth; antennæ of ♂ bipectinate, of ♀ filiform; thorax and abdomen untufted; hind tibiæ with all spurs present. Wings rounded, fore wings 12 veins, one accessory cell; hind wings 8 veins, 3 and 4 separate, 8 anastomosing with cell to beyond middle.

Species.— *V. cambrica* Curt.
*V. duodecimlineata* Pack.
*V. comptaria* Wlk. (perlineata *Pack.*)
*V. inclinitaria* Wlk.

### 18. EUCHŒCA Hüb.

Verz. 298, 1818.

Type *obliterata* Hüb.

*Hydrœlia* Hüb., Verz. 322, 1818. type *sylvata* Hüb.
*Trichodezia* Warr., Zoo. Nov. ii. pt. 2, p. 119, 1895, type *albovittata* Guen.

Palpi short scaled, slender, porrect; tongue developed; front smooth; antennæ filiform, ciliate; thorax and abdomen untufted; hind tibiæ with two pairs of spurs; fore wings 12 veins, one accessory cell; hind wings 8 veins, 8 anastomosing with cell to beyond middle.

Mr. Warren says his genus *Trichodezia*, of which *albovittata* is type, "has a long tuft of dark hairs towards the inner margin of fore wing on underside." He does not say whether this is a sexual peculiarity or common to both sexes. I have, however, been unable to find the peculiarity in either sex after examining numerous specimens, and so place it as a synonym. The venation of the hind wings is, however, somewhat abnormal as 8 does not unite with the cell through the basal half of the cell's length.

Species.—*E. albovittata* Guen.
*E. californiata* Pack.
*E. cretaceata* Pack.
*E. lucata* Guen.
*E. albogilvaria* Morr.

### 19. ASTHENA Hüb.

Verz. 310, 1818 (*Epirrita* Hüb., Tentamen 1810).

Type *candidata* Schif.

*Oporinia* Hüb., Verz. 321. 1818, type *dilutata* Bork.
*Minoa* Dup., Hist. Nat. Fr. viii. 545, 1829, type *murinata* Sc.
*Oporabia* Steph., Ills. iii. 273, 1831, type *dilutata* Bork.

Palpi short, porrect; front smooth, flat; antennæ filiform in both sexes; thorax and abdomen untufted; fore tibiæ unarmed, hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings 8 with cell to beyond middle.

As Mr. Meyrick remarks, there can be no doubt concerning the application of this generic name, as only one species was placed under it by Hübner. It corresponds with the Tentamen name *Epirrita*, whose type was *dilutata* Bork. As stated before I do not recognize the Tentamen names, but indicate where they apply if any please to make use of them.

Species.—*A. dilutata* Bork.

### 20. **CORYPHISTA** n. gen.

Type *meadii* Pack.

Palpi porrect, rather long; clypeus with a conical tuft; antennæ slender, flattened, minutely ciliate. Abdomen of ♂ with lateral pencil of hair on penultimate segment; hind tibiæ with all spurs present; fore wings 12 veins, two accessory cells, 6 and 7 from a point; hind wings scalloped, with lobe along inner margin in ♂ near middle, with a ridge or brush of stout hairs on lower edge; hind wings with 8 veins, 3 and 4 separate, 6 and 7 stemmed, 8 with cell half its length.

Species.—*C. meadii* Pack.
*C. badiata* Hy. Edw.

Close to *Calocalpe* Hüb., but differing in the terminal abdominal tuftings.

### 21. **CALOCALPE** Hüb.

Verz. 330, 1818.

Type *undulata* Linn.

*Eucosmia* Steph., Ill. iii, 265, 1831, type *undulata* L.

Palpi moderate, scaled, porrect; tongue developed; clypeus with scale tuft; antennæ ciliate in both sexes; thorax and abdomen scaled, untufted; hind tibiæ with all spurs present, in ♂ very short; fore wings 12 veined, with two accessory cells; 3 and 4 separate; hind wings of ♂ with fold along inner margin beneath containing a hair tufting, 3 and 4 separate, 8 anastomosing with cell to beyond middle.

Species.—*C. undulata* L.

### 22. **CATOCLOTHIS** n. gen.

*Cyclica* Grt., Can. Ent. xiv, 174, 1882.

Type *frondaria* Grt.

Palpi long, porrect, or somewhat drooping; clypeus somewhat drooping; antennæ of ♂ bipectinate; thorax with a dorsal posterior tuft. Abdomen tufted at end; hind legs with all spurs present; fore wings 11 veins, two accessory cells, 6 long stemmed with 7, 8 and 9 arising from nearly the same point as 7, 10 wanting; hind wings 8 veins, 5 near 4, 6 and 7 stemmed, 8 with cell more than half its length; all wings extended.

Peculiar in having but 11 veins in the fore wings, and also in having in the hind wings vein 5 arising almost at a point with 4;

also in hind wings vein 8 is strongly divided at base forming an approach to the fovea sometimes seen in the Ennominæ. The only species known is very considerably like *Selidosema* (*Boarmia*) in appearance. The genus is abundantly distinct from *Chesias*, being like it only in superficial appearance and the outward form of the wings; the antennæ are bipectinate in the ♂, not dentate as Mr. Grote says. Mr. Grote's name *Cyclica* is preoccupied.

Species.—*C. frondaria* Grt.

### 23. **PHILEREME** Hüb.

Verz. 330, 1818.

Type *rhamnata* Schif.

*Scotosia* Steph.. Ills. iii, 259. 1831, type *rhamnata* Schif.

Palpi moderate, scaled, porrect; tongue developed; clypeus scale tufted; antennæ ciliate in both sexes; thorax sometimes tufted. Abdomen untufted, in ♂ with anal claspers large, exserted; hind tibiæ with all spurs present; fore wings 12 veined, two accessory cells, 3 and 4 separate; hind wings 8 veined, 3 and 4 separate, 8 with cell to beyond middle.

In my opinion a doubtful genus, as the distinctive character, the exserted claspers of the ♂, seems to be comparative, and to some extent variable as based upon the circumstances of the death of the insect.

Species.—*P. californiata* Pack.
*P. multivagata* Hulst.
*P. formosa* Hulst, n. sp.

**P. formosa** n. sp.—Expands 35 mm. Palpi moderate fuscous; thorax fuscous. Abdomen ochreous, washed with fuscous, each segment lined with black posteriorly; fore wings light fuscous gray, banded and shaded with smoky fuscous; basal portion with two faint shadow lines, followed by a smoky brown, even broad shading, obsolete at costa, reaching from subcostal to inner margin; beyond this, edging the basal field a wavy black line; the median space is smoky fuscous, broader at costa than inner margin, outer line rounded between veins forming an extended dull angle between 4 and 5; beyond this the ground color and beyond this a submarginal waved dentate whitish line, edged both sides with smoky fuscous, somewhat brownish on inner side; an apical black spot, followed beneath by a second and larger one; marginal line black; hind wings even light ocher fuscous, the veins slightly darkened; beneath on fore wings fuscous to outer field then lighter, except towards apex; hind wings with median black line; discal joints evident above and below, quite prominent on fore wings above.

Colorado. From Mr. Bruce.

Differs from the typical *Philereme* in the fact that the thorax is tufted posteriorly, and the vestiture is very decidedly hairy on the fore wings.

### 24. **PHYLACE** n. gen.

Type *luteolata* Hulst.

Palpi long, somewhat drooping or porrect, slender, rather heavily haired; clypeus with conical tuft; antennæ of ♂ bipectinate, of ♀ bidentate; thorax with posterior dorsal tuft. Abdomen of ♂ tufted at end; hind tibiæ with all spurs present; fore wings 12 veins, two accessory cells, 6 somewhat stemmed with 7; hind wings 8 veins, 3 and 4 separate, 6 and 7 separate, 8 joined with cell one-half its length.

Very close to *Eustroma* Hüb., from which it differs in the structure of the antennæ, and the absence of the hair pencil of the fore wings in ♂. It differs from *Neolexia* in the latter respect.

Species.—*P. luteolata* Hulst, n. sp.

**P. luteolata** n. sp.—Expands 32 40 mm. Palpi yellow ochreous, fuscous or blackish at extreme tip; antennæ, head, thorax, abdomen and wings yellow ochreous, the thorax a little mixed with fuscous scales and the abdomen yellowish laterally; fore wings with four yellowish brown lines arranged as in *Neolexia xylina*, and of the same general course, but without the base, middle field or outer part being filled in with darker color; between these bands are fainter cross-lines, or faint broader shadings of narrow bands of same color with the more distinct cross-lines; hind wings more yellowish outwardly, with indications of lines within anal angle scarcely evident; beneath ochreous, the outer middle line evident on fore wings and a marginal subapical spot darker than the ground color; hind wings with two faint middle lines crossing the wing.

Two males, one female. Colorado and New Mexico. The insect is very much of the color and general appearance of *Eustroma diversilineatum*, with the lines in the shape of those of *E. populatum* or *E. prunatum*. It has probably been regarded as a form of *E. diversilineata*, but is very distinct as having bipectinate antennæ and wanting the hair pencil on the fore wings below in the male.

### 25. **EUSTROMA** Hüb.

Verz. 335, 1818.

Type *prunata* L.

Palpi rather long, porrect; front tufted; antennæ of ♂ filiform ciliate, or somewhat serrate; fore tibiæ unarmed, hind tibiæ with all spurs present, without hair pencil in ♂; fore wings with two accessory cells, 12 veins, in ♂ with strong pencil of hairs beneath at base of 1*b*; hind wings 8 veins, 8 with base to beyond middle.

Species.—*E. diversilineatum* Hüb.
*E. populatum* L.
*E. testatum* L.
*E. destinatum* Moesch.
*E. prunatum* L.
*E. nubilatum* Pack.
*E. atrocoloratum* Grt.
*E. explanatum* Walk. (cunigerata *Wlk.*)

### 26. NEOLEXIA n. gen.

Type *xylina* Hulst.

Palpi long, porrect, or somewhat drooping, second segment long haired; tongue quite strong; clypeus with a conical tuft; antennæ of ♂ bipectinate; thorax with dorsal tuft of hairs posteriorly. Legs with all spurs present; fore wings 12 veined, with two accessory cells and with a strong pencil of hairs below near base of 1*b*; hind wings 8 veins, 4 and 5 separate, 6 and 7 separate, 8 joined with the cell one-half its length.

Species.—*N. xylina* Hulst, n. sp.
*N. speciosa* Hulst, n. sp.

**N. xylina** n. sp.—Expands 38–40 mm. Palpi and head ochreous fuscous; antennæ fuscous, with a slight ochreous tinge; thorax ochreous, the post-dorsal tuft yellowish. Abdomen buff on the sides, posteriorly somewhat reddish brown; fore wings grayish and brown, the latter forming a broad band filling the basal field about one-fourth of the length of wing along costa, with two or three rather faint, darker, subparallel cross-lines included, the outer margin unevenly sinuate, the most prominent bend, almost a dentation, being on cell; this is followed by a band of grayish considerably stained with brown, the outer edge being unevenly sinuous, the strongest bend being at the submedian outwardly, then follows a very broad brown band, broader at costa than on the inner margin with two included sinuate shade lines near middle, these showing with whitish along costa; the outer edge of the band is unevenly sinuate, rounded inwardly below costa, where it is edged outwardly with whitish, then rounded outwardly and strongly at the middle and again below, then running straight to costa, the scallops being divided by teeth at veins 2, 3 and 4, that at 4 being the least prominent; beyond the wing is grayish with brown tintings, with three black triangular spots, base inward beyond the white lunule beyond disc, and with a brownish subtriangular spot on outer edge below apex; marginal line black broken; hind wings fuscous gray, blackish lines showing on inner margin outwardly and fading into indistinct dentate lines across the wing; beneath ochreous gray, powdered with brownish on the fore wings, the outer part of the middle band and the outer subapical spot showing; on hind wings a faint submarginal line dentate emphasized at the points giving the appearance of a row of faint blackish spots.

New York, Washington, Montana, Alberta, Canada. Very much in appearance like *Eustroma prunata*, with which it may have been confounded, but easily distinguished by the bipectinate antennæ.

The specimen received from Calgarry has the cross-bands blackish instead of brown, and the hind wings have a more distinct banding.

**N. speciosa** n. sp.—Expands 40 mm. Palpi dark fuscous: front blackish fuscous: front black; antennæ black above, fuscous ochreous below; thorax dark fuscous, the tufts bright orange-yellow. Abdomen gray, mixed with fuscous, with white dorsal line and with each segment black subdorsally and posteriorly; fore wings base black with some gray scales across middle, a broad white intra-discal band beyond, shaded with yellowish, except at edges, and with some mixing of blackish scales, a discal band beyond this black, rather narrower than the intra-discal, very slightly lightened at middle; outer space white shaded with yellow and olive to edge; a scalloped submarginal line, the lunules white without black within, with two heavy black triangular spots below costa near apex, and a large subapical black spot along edge lined above and inwardly with white; a broken submarginal black line; hind wings smoky gray with two outer scalloped lines both edged with whitish outwardly; beneath smoky to outer part of discal band on both wings, then a whitish band; on fore wings beyond this smoky, with whitish at apex, and on hind wings with a blackish cross-line, the outer space whitish.

One ♂, Calgarry, Alberta, Canada. From Mr. F. H. Wolley-Dod.

This may be a variety of *N. xylina* Hulst, but the color and shaping of the bands is different, and there is difference of position in the lines of the hind wings.

### 27. PLEMYRIA Hüb.

Verz. 327, 1818 (*Rheumaptera* Hüb. Tentamen 1810).

Type *bicolorata* Hüb.

*Cosmorhoe* Hüb., Verz. 326, 1818, type *galiata* Hüb.
*Epirrhoe* Hüb., Verz. 328, 1818, type *rivata* Hüb.
*Eulypa* Hüb., Verz., 328, 1818, type *hastata* L.
*Melanippe* Dup., Hist. Nat. viii, 277, 1829, type *hastata* L.

Palpi moderate, scaled; tongue developed; clypeus somewhat scale tufted; antennæ filiform ciliate in both sexes; thorax and abdomen smooth; hind tibiæ with all spurs; fore wings 12 veins, one accessory cell; hind wings, 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

This corresponds to the Tentamen genus *Rheumaptera*, the type of which was *hastata*. Mr. Meyrick calls this genus *Plemyria*, of which *bicolorata* Hüb. is the type. *Cosmorhoe* was named by Hübner with *galiata* Hüb. as type. *Galiata* and *bicolorata* are conge-

neric. *Cosmorhoe* has priority of page, though not of time. The name *Plemyria* must stand as the genus name, however, under the code.

Species.—*P. hastata* L.
*P. tristata* L.
*P. sociata* L.
*P. delimitata* Warr.
*P. georgii* Hulst, n. sp.
*P. rubrosuffusata* Pack.
*P. obductata* Moesch.

**P. georgii** n. sp.—Expands 28-31 mm. Palpi quite long, prominent, porrect, end member drooping, fuscous gray; clypeus and thorax dark gray. Abdomen mouse-gray to blackish gray; fore wings mouse or fuscous gray, with a faint violet tinge; basal line lighter, distinct, sinuous, edged within with a darkish band; a middle black line narrow, rounded to behind cell then pointed outwardly on veins, extending in general direction outwardly towards inner margin; an outer fine black line rounded outwardly to vein 3, then angulated inwardly on veins to inner margin, the lines on veins joining those of median line separating the median space into rounded dots, these sometimes entirely separated, the veins becoming lighter between the parted black line; the lines have a darker brownish or reddish band within the middle space forming a large rounded discal annulus, which is lighter in the middle, this enclosing the discal spot; outer space darker, again enclosing an evenly scalloped, distinct, whitish outer line; marginal line broken black; hind wings mouse-gray or ocher-gray, with a submarginal clouding forming an indistinct band; beneath gray fuscous; fore wings with faint line beyond discal spot and faint submarginal band; hind wings with black discal spot, and a fine, quite distinct line beyond marginal space, some darker.

California, Nevada, Washington, Vancouver Island.

### 28. ZENOPHLEPS n. gen.

Type *lignocolorata* Pack.

Palpi prominent, heavy, porrect; tongue developed; clypeus scaled with strongly developed scale tuft; antennæ bipectinate in ♂, filiform in ♀; thorax untufted. Abdomen somewhat tufted at end in ♂; hind tibiæ with all spurs present. Wings broad, even; fore wings 12 veined, one accessory cell, 5 nearer 6 than 4, 6 and 7 stemmed, separate from 8 and 9; hind wings 8 veins, 8 with cell to beyond middle.

As Mr. Meyrick remarks, in speaking of *Cataclysme* Hüb., a corresponding European genus, the venation is very anomalous among the Hydriomenidæ, and is, so far as the relations of 6 and 7 with 8 and 9 of the fore wings go, the same as the distinctive venation of the Strophidiinæ. The rest of the venation is distinctively of the

present family, as is the whole aspect of the species. Mr. Meyrick explains these as anomalous forms in which the posterior wall of the second accessory cell has become obsolete; he therefore speaks of the insect as having two accessory cells in fore wings. *Zenophleps* differs from *Cataclysme* Hüb. in having bipectinate antennæ in the ♂.

Species.—*Z. lignicolorata* Pack.

*Z. obscurata* Hulst, n. sp.

**Z. obscurata** n. sp.—Expands 26 mm. Palpi ochreous brown, blackish towards end; head ochreous fuscous, with thorax and abdomen of same color; fore wings grayish, well mixed with blackish scales, and with many not very decided blackish cross-lines, and the whole washed with yellow ochreous, especially on the outer third; the lines are arranged in three bands, the first basal, the second median within the black discal spot, the third beyond the discal spot; they all are lighter between the limiting lines, are quite evenly rounded outwardly, pretty evenly dentate on both sides the middle one being the most even; the outer one has two or three little white spots outwardly at veins 2, 3 and 4; outer space arranged in two or three lighter and darker bands, sharply and evenly dentate; a line of black marginal spots: fringe concolorous with outer part of wing; hind wings corresponding very much to pattern of fore wings, but all basal markings lost, and middle band showing in a rounded, distinct, blackish line; beneath fuscous gray, the bands on both wings showing in deeper color, rather solid and quite decidedly manifest in a broad marginal band on both wings.

One male, Siskiyou County, California.

### 29. ENCHORIA n. gen.

Type *osculata* Hulst.

Palpi short, rough, hairy; front rough scaled, scarcely tufted; tongue developed; antennæ of ♂ flattened, dentate, finely ciliate below; thorax with a double anterior tuft, and also a low posterior tuft. Abdomen slightly tufted at end; hind tibiæ with two pairs of spurs; fore wings two accessory cells, 12 veins; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

Differs from *Gypsochroa* Hüb. in that the antennæ are evenly ciliate, not fascicled with hairs.

Species.—*E. osculata* Hulst, n. sp.

**E. osculata** n. sp.—Expands 24 mm. Palpi, front and thorax fuscous, with black scales intermixed, the whole vestiture being squamose and diffuse. Abdomen diffuse, fuscous, the first segment being more blackish and the fourth blackish dorsally; fore wings fuscous, the whole surface covered with more or less faint, dentate, or wavy lines, parallel with the rounded outer margin: these show most decidedly by a faint basal cross-band, somewhat darker than the ground color, edged inwardly and outwardly by a more grayish color, the dentations of the outer lines marked with black on veins; discal spots prominent black with whitish

flecks beyond; outer lines most prominent, geminate, gray, sinused outwardly between veins 5 and 2, dentate wavy all their length; a submarginal, faint, wavy gray line; fringes color of wings with lighter intermissions; hind wings rather satiny white, slightly stained with fuscous and with black atoms basally and along inner margin; beneath dull white on all wings, fuscous stained along costa, speckled with black scales basally on fore wings and all over hind wings with large blackish spot at apex of fore wings divided by whitish line, all wings with black discal spots.

Southern California.

### 30. PERCNOPTILOTA n. gen.

Type *fluviata* Hüb.

*Plemyrie* Hüb., Verz. 334. 1818, type *fluviata* Hüb.

Palpi rather long, porrect; tongue developed; front with conical tuft of scales; antennæ of ♂ filiform, with fascicles of hairs on each segment; thorax without posterior tuft. Abdomen tufted at end; hind tibiæ with two pairs of spurs; fore wings 12 veined, two accessory cells; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

*Plemyrie* Hüb., applied to this species, is preoccupied by *Plemyria* Hüb., the names being the same, one partially, the other entirely latinized.

Species.—*P. fluviata* Hüb.

### 31. MESOLEUCA Hüb.

Verz. 326, 1818.

Type *albicillata* Linn.

*Glaucopteryx* Hüb., Verz. 332, 1818, type *cæsiata* Lang.
*Melanthia* Dup., Hist. Nat. viii, 252, 1829, type *procellata* Fab.
*Camptogramma* Steph., Ill. iii, 263, 1831, type *bilineata* L.

Palpi moderate; front with tuft of scales; tongue developed; antennæ of ♂ filiform ciliate; thorax with or without posterior tuft. Abdomen sometimes tufted at end; hind tibiæ with all spurs, fore wings with two accessory cells, 12 veins; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

Species:—

*M. ruficiliata* Guen.
*M. gratulata* Walk. (brunneicil-[iata *Pack.*)
*M. cæsiata* Bork.
*M. lacustrata* Guen.
*M. brunneimaculata* Bates.
*M. truncata* Hüb.
*M. silaceata* var. *deflavata* Staud.
*M. albolineata* Pack.
*M. suspectata* Moesch.
*M. hersiliata* Guen.
*M. ethela* Hulst, n. sp.
*M. vasaliata* Guen.

**M. ethela** n. sp.—Expands 30 mm. Palpi and head fuscous ochreous; antennæ fuscous; thorax fuscous ochreous. Abdomen fuscous gray; fore wings cream color from base one-third out, with a shading of blackish scales along costa at base, terminated outwardly by a rounded dentate line; beyond, a broad dark gray band with veins all somewhat darker lined, this band scalloped outwardly, the scallop being most prominent at vein 4, and the dentations marked by the veins; beyond this band a cream colored line broadening towards costa, followed by a broad dark gray submarginal band, which is somewhat reddish next to the cream colored line; margin blackish; hind wings whitish, a little fuscous tinted outwardly, with line of blackish marginal spots along outer border; beneath light cream fuscous, with darker outer shadings; hind wings whitish fuscous.

One ♂ Sierra Nevada, California.

### 32. **HYDRIOMENA** Hüb.

Verz. 322, 1818.

Type *trifasciata* Bork.

*Euphyia* Hüb., Verz. 326, 1818, type *picata* Hüb.
? *Perizoma* Hüb., Verz. 331, 1818, type *adæquata* Bork.
? *Entephria* Hüb., Verz. 331, 1818, type *flavicinctata* Hüb.
*Chloroclysta* Hüb., Verz. 332, 1818, type *miata* L.
*Dysstroma* Hüb., Verz. 333, 1818, type *truncata* Hufn.
*Harpalyce* Steph., Cat. ii, 131, 1829, type *fulvata* Forst.
*Ypsipetes* Steph., Cat. ii, 138, 1829, type *trifasciata* Bork.
*Emmelesia* Steph., Cat. ii, 147, 1829, type *decolorata* Hüb.
*Mæsia* Steph., Ill. iii, 150, 1831, type *decolorata* Hüb.
*Polyphrasia* Steph., Ill. iii, 227, 1831, type *immanata* Haw.
*Euthalia* Steph., Ill. iii, 252, 1831, type *miata* L.
*Thera* Steph., Ill. iii, 271, 1831, type *simulata* Hüb.
*Phasyle* Dup., Cat. Meth. 254, 1844, type *malvata* Ramb.
*Ceratodalia* Pack., Geom. Moths. 322, 1876, type *gueneata* Pack.

Palpi moderate or long; tongue of ♂ developed; front with or without scale tuft; antennæ flattened, often naked, shortly and finely ciliate below; thorax with posterior tuft more or less developed. Abdomen often tufted at end; hind tibiæ with all spurs; fore wings with two accessory cells, 12 veins; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

This genus, with what I have placed under *Mesoleuca*, *Cœnocalpe*, *Triphosa*, *Euchoria* and *Gypsochroa*, are all grouped by Mr. Meyrick under *Hydriomena*. He recognises there are very considerable differences in structure which would easily warrant generic separation, but thinks the species so intergrade in every structural point that it is impossible to draw a distinct line anywhere. I agree with him entirely, yet think it wiser to draw an artificial line than to lump very widely variant species under one genus, which thus becomes very large and unwieldy, as well as discordant. In very few

species is there any doubt as to the group in which they naturally fall, and I have in a sort of a way made *Hydriomena* the refuge of species whose ♂ I have not seen, and whose exact reference cannot therefore be given. The species under it are yet in respect to palpi, antennæ, thoracic tuftings, and the position of vein 6 of fore wings very variable, but I hesitate to make any further divisions, as the bulk of species lie midway between the extremes. *Trifasciata*, the type of *Hydriomena*, has very long palpi, and is in some other respects rather an extreme species.

Species:—

*H. sordidata* Fab.
*H. trifasciata* Bork.
*H. californiata* Pack.
*H. speciosata* Pack.
*H. reflata* Grt.
*H. similaris* Hulst, n. sp.
*H. contracta* Pack.
*H. sparsimacula* Hulst, n. sp.
*H. herbicolata* Hulst, n. sp.
*H. basaliata* Walk.
*H. latirupta* Walk.
*H. multiferata* Walk.
*H. curvilinea* Hulst, n. sp.
*H. immediata* Grt.
*H. costiguttata* Hulst, n. sp.
*H. gueneata* Pack.
*H. mirabilata* Grt.
*H. unangulata* Haw.
*H. neomexicana* Hulst, n. sp.
*H. australata* Hulst.
*H. custodiata* Guen.
*H. ablata* Hulst, n. sp.

**H. similaris** n. sp.—Expands 28–31 mm. Palpi blackish gray; front dark gray; thorax same color with more of gray, with a posterior tufting blackish at end. Abdomen fuscous; fore wings base gray, mixed with scattered black scales, limited by a black line somewhat oblique, angled at cell, then a broad band of blackish, lightened with gray scales which run in the form of two narrow broad cross-lines; this band reaches only to the discal point, the outer limiting black line passing through the discal point rounding out to it from costa thence inwardly to below cell, then outwardly to inner margin; then comes a comparatively narrow grayish band, not distinctly limited outwardly, having near its outer edge the outer black cross-line which is wavy dentate, with its two most prominent and equal protuberances between veins 2 and 3 and 3 and 4; outer space dark, much lightened behind middle, and with two or three subapical black dashes; hind wings light fuscous; all margins blackish; beneath, color of hind wings above, on fore wings darker along costa and outwardly towards apex.

Colorado. From Mr. Graef.

**H. ablata** n. sp.—Expands 28 mm. Palpi fuscous gray; thorax and front fuscous. Abdomen fuscous, each segment with a black anterior line; fore wings light gray, with blackish lines and shadings; base dark fuscous, mixed with gray; basal line rounded outwardly at cell, and angled inwardly at 1*a*; beyond base an intra-discal gray band sprinkled with black scales, then a blackish discal band narrower than usual, scalloped on both sides, the teeth on the veins and towards

each other reaching so far in towards inner margin as to almost form ringlets, then an extra-discal gray band much clouded and striated with blackish scales, with a deep cloud along costa, with a black submarginal line, scalloped, outwardly dentate; marginal space blackish below apex; hind wings fuscous, with a faint middle lighter cross-line; beneath light fuscous, faintly revealing the markings above.

Arizona.

**H. sparsimacula** n. sp.—Expands 28 mm. Palpi light cinereous, black at end; front and thorax gray. Abdomen fuscous dorsally, much lighter on sides and below: fore wings light glaucous gray, washed with fuscous, with dark markings along costa showing the beginning of basal, discal, extra-discal and outer cross-lines, these discernible across the wing only by the lighter edging cross-lines and a few black scales; a black spot at middle of inner margin and another at anal angle; also one or two small black spots at apex; hind wings dull whitish, with two faint, even rounded, broad cross-lines, and a faint submarginal line; beneath even, lighter, very faintly showing markings above.

California; near some variations of *H. californiata* Pack., especially those of the *glaucata* form.

**H. neo-mexicana** n. sp.—Expands 38-42 mm. Palpi fuscous above, blackish on sides and below; under part of head whitish; face fuscous black; thorax dark fuscous to grayish black. Abdomen dark fuscous, ringed with lighter fuscous, a blackish spot dorsally on each segment. Wings varying from light to dark fuscous, in fresh specimens darker, and then with a grayish olive shading; the whole surface of the fore wings is covered with scalloped cross-lines of varying intensity, the rounded part outward and generally subparallel, the lines being of a lighter color, the interspaces darker; at the base the darker color is emphasized by blackish forming a darker basal space, then a broad, generally lighter space to a broad central darker band, the inner line of this heavily shaded with blackish outwardly, the outer line with blackish inwardly, the inner dentate scalloped, the outer more irregular than usual with two strongly projecting outer scallops on veins 3 and 4; a submarginal outer line whitish, serrate on both sides; hind wings rather even fuscous, with faint indications of scalloped lines outwardly, especially near inner angle; beneath both wings light fuscous with a quite blackish undulating hair line beyond middle, and a broad, even, submarginal, blackish band; marginal lighter, fringe checkered with black at end of veins.

Described from a number of specimens in collection of Neumoegen and myself. Mr. Neumoegen's specimens are without locality, though I think they were said to be from Florida. My own specimens are from New Mexico (Cockerell), Colorado (Gillette) and Florida.

**H. herbicolata** n. sp.—Expands 18-20 mm. Palpi short, rather coarsely haired, blackish or black and ocher gray mixed; clypeus rather coarsely long haired, somewhat tufted; thorax rather squamose, black and gray intermixed. Abdomen fuscous ocher and black intermixed, the basal segment darker than the

rest; fore wings light fuscous gray, basal space blackish followed by an indeterminate broad cross-line somewhat angulated, which is followed by an indistinct dark band often showing only on the outer edges, this band being wavy sinuous and of the same width across the wing, and on its outer side almost touching the black discal spot; an outer sinuous whitish line, often clear white on costal half, angulated outward at vein 6, then an irregular inner sinus running outward to an angle at vein 4, this angle almost reaching the edge of wing, thence the line is wavy angulate, subparallel with edge of wing to inner margin; this line is edged within with a broad dark band which generally is evident only on lines limiting edge and is sometimes faint and indeterminate, sometimes with black dashes on veins 2, 3 and 4; outer space clouded below apex and a marginal line of black dashes hardly broken; hind wings light gray, darker towards base with black discal spot; beneath lighter than above, the outer lines showing, the white line much broader with whitish apical spot; hind wings color as above with two fine cross-lines, the inner straight across the wings, the outer rounded, scalloped.

Havilah, Cal., two males, two females. From Hy. Edwards, No. 7641.

There is much difference in the two sexes, the males being much more distinctly marked and lined, and especially with the outer white line.

**H. curvilinea** n. sp.—Expands 28 mm. Palpi short, somewhat long scaled, black and gray intermixed; clypeus and thorax gray. Abdomen ochreous; fore wings dull clay white, a blackish even basal cross-band scarcely curved, another corresponding band on middle field evenly curved across wing, edged within by a faint light tinge; outer field with a band distinct at costa, broken and indeterminate across wings, showing mostly as dark dashes on veins; outer space darker, more broad apically, showing an included dentate line parallel with outer margin; marginal line black; hind wings light clay fuscous with faint double median cross-line; beneath much as above, but much fainter.

Vancouver Island, British Columbia.

**H. costiguttata** n. sp.—Expands 25 mm. Palpi blackish gray; front gray, black below; thorax light gray on extreme front, collar and posteriorly, with a black band across between anterior half of base of fore wings. Abdomen white, stained somewhat on anterior part of segments with fuscous. Wings white, somewhat stained with fuscous; fore wings with two subtriangular black spots along costa, followed in each case by fine geminate wavy black lines limiting the middle field, the course being much as in *X. abrasaria* H.-Sch., the veins on the course of these lines somewhat marked with black dashes; outer field clouded, faintly showing submarginal lighter scalloped line; marginal line black, broken, two spots between each of the veins; hind wings with faint median line, marginal line as on fore wings; beneath slightly darker, costal spots indistinct, lines indistinct, almost obsolete.

California, from Hy. Edwards. In appearance very much like *Thamnonoma subcessaria* Walk.

### 33. **TRIPHOSA** Steph.

Cat. 44. 1829.

Type *dubitata* L.

Palpi rather long, stout, long scaled at base, subascending; tongue developed; front with scale tuft; antennæ of ♂ slightly flattened, finely ciliate; thorax tufted posteriorly. Abdomen tufted at end; hind tibiæ with two pairs of spurs; fore wings two accessory cells, 12 veins; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle, outer margin of wings scalloped.

*Plerocymia* Hüb., Verz. 330, 1818, has *dubitata* catalogued under it, but the first and more prominent species, *cervinata* has bipectinate antennæ, and taking that as type, the genus becomes a synonym of *Xanthorhœ* Hüb., Verz. 327, 1818.

Species.—*T. dubitata* Linn.
*T. progressata* Walk. (indubitata *Grt.*)

### 34. **CŒNOCALPE** Hüb.

Verz. 330. 1818.

*Cbrythea* Dup., Cat. Meth. 257, 1844, type *juniperata* L.
*Stamnodes* Guen., Phal. ii, 515, 1857, type *pauperaria* Evers.

Palpi moderate, or quite long; tongue developed; front smooth, sometimes flat, sometimes rounded and protuberant; antennæ of ♂ filiform, flattened, finely ciliate beneath; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings 8 with cell to beyond middle.

A genus as here limited with considerable variation in structure. The species agree, however, in the flattened antennæ of the ♂.

Species:—

| | |
|---|---|
| *C. aurata* Grt. | *C. gibbocostata* Walk. |
| *C. magnoliata* Guen. | *C. annellata* Hulst. |
| *C. oxygramma* Hulst, n. sp. | *C. morrisata* Hulst. |
| *C. carneata* Pack. | *C. tessellata* Pack. |
| *C. alaskæ* Hulst, n. sp. | *C. fervifactaria* Grt. |
| *C. parinotata* Zell. | *C. formosata* Streck. |
| *C. polygrammata* Hulst, n. sp. | *C. seifertii* Neum. |

**C. alaskæ** n. sp.—Expands 28 mm. Palpi blackish and ochreous, slender, porrect, strongly scaled; clypeus tufted; antennæ fuscous ochreous, flattened, scarcely ciliate beneath; thorax ochreous. Abdomen ochreous, interlined with fuscous ochreous on each segment; fore wings ochreous brown, darker on basal field and medially, the latter forming a distinct band quite even and of even width en-

closing the distinct discal spot at about its middle: outer space also darker, edged within with a sinuous dark line followed by a line of ground color, and the band broken by the lighter veins which are of the ground color of the wings; marginal line brown; hind wings light ochreous, becoming more pronounced ochreous outwardly: beneath all wings of an even smoky ochreous color, the fore wings showing a shade darker outwardly, and within apex along costa.

Alaska. Two specimens from Prof. Riley, neither in good condition.

**C. polygrammata** n. sp.—Expands 18–22 mm. Palpi gray or blackish gray, extended, heavy, porrect or drooping; clypeus tufted, gray or blackish gray; thorax slightly tufted posteriorly, gray or blackish gray. Abdomen ringed, varying from light to dark gray, and also sometimes stained with ocher; fore wings light gray to gray crossed by many nearly parallel cross-lines, these not so heavy generally on basal space, and on outer space, giving in most cases the appearance of a broad central band running evenly across the wing, the discal portion narrowly being a shade lighter, and the outer and inner lines here being less parallel; the outer space is sometimes narrowly lighter outside middle band, often broadly so, the whole space being of the same color, and this and basal space often also tinted with ocher yellow; margin somewhat darker, with a narrow, even, dentate, whitish line parallel with outer margin.

Colorado, from Mr. Bruce; California, from Dr. Riley; Ariz.

**C. oxygramma** n. sp.—Expands 34 mm. Palpi and face fuscous gray, the palpi short and scaly; thorax light gray, patagiæ whitish. Abdomen ringed with gray and whitish, ocher tinted towards end; fore wings white, somewhat dull, with blackish cross-lines, the first basal bent even, extreme base blackish, then a narrow band within discal spot bent outward at cell, then wavy to before vein 1, there bent at a right angle towards base following the line, then again bent at a right angle to inner margin, this darker on margins and the same width across the wing; another band of like width and color beyond discal spot sinuous, with three bends across the wing in the general direction of outer margin merging with previous band at middle of wing and then separating to inner margin, the two bands thus enclosing a long costal space and a rounded triangular space at inner margin; another band incomplete, but well marked near apex and again at vein 5, almost obsolete otherwise; marginal line of black dots, discal spot black, the outer cell and veins tinged with yellow; hind wings light gray, with trace of median and marginal cross-lines; beneath as above, but less distinct, the two middle bands scarcely joining.

Havilah, Cal. From Henry Edwards.

### 35. MELANOPTILON H.-Sch.

*Ausen. Schme.* 1855.

Type *bifenestratum* H.-Sch.

*Emplocia* Guen., Phal. ii, 531, 1857, type *hesperidaria* Guen.

Palpi short, porrect; tongue developed; front short scaled, broad, somewhat rounded; antennæ flattened, even, or subdentate in ♂, flattened, filiform in ♀. Thorax and abdomen untufted, very closely

scaled; fore tibiæ unarmed, hind tibiæ with all spurs. Wings very closely short scaled; fore wings very rounded at apex, 12 veins, two accessory cells, 10 and 11 from cell; hind wings 8 veins, 3 and 4 widely separate, 5 nearer 4 than 6, 6 and 7 stemmed, 8 with cell to beyond middle.

The genus is scarcely warranted, as it is not sharply distinct structurally from *Cœnocalpe*, but it has a very different color aspect, has rounded fore wings, and the vestiture of body and wings is very short and close.

Species.—*M. cephisarium* Grt.

*M. cephisarium* Grt. may be *Melanchoria inconstans* Hüb.

### 36. **MARMOPTERYX** Pack.

Geom. Moths, 259, 1876.

Type *marmorata* Pack.

*Marmaropteryx* Gump. Nova Act. Halle, 49, 332, 1887.

Palpi short, rather heavy; tongue developed; clypeus very prominent, rounded, swollen, scaled, subcircular; antennæ of ♂ flattened, the segments even, of ♀ filiform; thorax and abdomen untufted; fore legs with tibiæ spined at end; hind legs with two pairs of spurs; fore wings 12 veined, two accessory cells, 10 and 11 from cell, 3 and 4 from a point; hind wings 8 veins, 3 and 4 separate, 6 and 7 short stemmed, 8 anastomosing with cell to beyond middle.

The species of this genus and other species formerly grouped under *Marmopteryx* beyond question belong to the Hydriomenidæ. They have no affinities whatever, so far as I can see, with the Ennomidæ, or the old subfamily Macariidæ, where they were formerly placed.

Species.—*M. marmorata* Pack.

*M. odontata* Hulst, n. sp.

**M. odontata** n. sp.—Expands 38-44 mm. Near *M. marmorata* Pack., of which it may be the Colorado form, though very different in appearance. Palpi reddish ocher; front less reddish, summit of head ocher; collar and anterior part of patagiæ reddish ocher, the rest of the thorax light ocher, as is also the abdomen. Wings light ocher, more reddish along costa and on outer field, and decidedly so on either side costally of the outer line. The color of costa broken by two squares of lighter color; outer line distinct towards costa, broad, whitish, rounded at vein 5, fading out towards inner margin; hind wings evenly colored, the band below faintly showing through; fringes of fore wings checkered with white, of hind wings uniform white; beneath as above in markings, the outer field lighter, the rest of the wing darker than above; outer field white at apex, smoky posteriorly, reddish on both sides of outer line at costa; hind wings white,

brown striations forming an indistinct band on outer margin, a similar band beginning at anal angle and reaching one-half across wing; at the middle another even band, red, forming an angle at vein 6; base somewhat striated with brown. Legs darker than thorax.

Colorado. The general markings are like *marmorata* Pack. above, but differ very decidedly below.

### 37. GYPSOCHROA Hüb.

Verz. 336, 1818.

Type *albulata* Schif.

*Cidaria* Treits., Sch. Eu. vi, 2, 242, 1828, type *designata* Rott.
*Z nodonta* Sodof., Bull. Soc. Mosc. p. 126, 1837, type *designata* Rott.

Palpi moderate, or quite long, porrect; front with tuft of scales; tongue developed; antennæ dentate, with fascicles of hairs on each segment; thorax with low posterior tuft. Abdomen tufted at end; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings 8 veins, 6 and 7 stemmed, 8 with cell to beyond middle.

Species.—*G. designata* Bork.
*G. hæsitata* Guen. (albosignata *Pack*).

### 38. EURHINOSEA Pack.

Proc. Bost. Soc. Nat. Hist. xvi, 35, 1874.

Type *flavata* Pack.

Palpi long, somewhat drooping at end; tongue developed; clypeus slightly or not at all tufted; antennæ of ♂ dentate and strongly pubescent; ♀ ciliate; thorax and abdomen untufted; hind tibiæ with two pairs of spurs; fore wings 12 veined, one accessory cell, 3 and 4 separate, 5 nearer 4 than 6, 10 on 11, 11 from cell, 12 free; hind wings 3 and 4 separate, 5 nearer 4 than 6, 6 and 7 stemmed, 8 anastomosing with cell to beyond middle.

Species.—*E. flavata* Pack.
*E. leoninata* Pack.
*E. mancipata* Guen.

### 39. PSYCHOPHORA Curt.

Type *sabinii* Curt.

Palpi porrect, rough haired, moderate; tongue developed; clypeus very broad, flattish, rough scaled; antennæ bipectinate in ♂, filiform pubescent in ♀; thorax rough hairy. Abdomen rough hairy, untufted. Wings vestiture hairy, fore wings 12 veined, two accessory cells, 3 and 4 close at base, 10 and 11 from cell, 12 free;

hind wings 8 veined, 3 and 4 close together, 5 at the middle of cell, 6 and 7 stemmed, 8 anastomosing with cell to beyond middle; hind legs with two pairs of spurs.

I have a specimen of *P. phocata* sent me by Mr. Moeschler, and therefore typical, and I can see no difference between it and *P. sabinii* Curt., of which I saw the type in the British Museum.

Species.—*P. sabinii* Curt. (phocata *Moesch.*)

### 40. **TRICHOCHLAMYS** n. gen.

Type *polata* Hüb.

Palpi moderate, porrect, long haired; tongue developed; front rough with projecting hairs; antennæ flattened, even, finely ciliate, or nearly naked in ♂, filiform ciliate in ♀; thorax loosely rough hairy scaled or hairy. Abdomen rough scaled; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings 8 veins, 8 with cell to beyond middle.

Mr. Meyrick catalogues *polata* under *Dasyuris* Guen., which it closely approaches But *Dasyuris* has the antennæ of ♂ dentate, which *polata* has not. I therefore propose the above as a designation of the genus.

Species.—*T. polata* Hüb.
*T. lacteata* Pack.

### 41. **ERSEPHILA** n. gen.

Type *grandipennis* Hulst.

Palpi long, subascending, end member horizontal; front smooth, rounded, prominent; antennæ shortly bipectinate, fasciculate in ♂, filiform in ♀; thorax with posterior tuft. Abdomen of ♂ with anal tuft; fore tibiæ unarmed, hind tibiæ with all spurs; fore wings 12 veins, two accessory cells; hind wings extended, broad, 8 veins, 5 near 4, 6 and 7 stemmed, 8 with cell to beyond middle.

Near *Xanthorhöe*, but with long palpi. Nearer *Hydriomena*, but the antennæ have short pectinations.

Species.—*E. grandipennis* Hulst, n. sp.

**E. grandipennis** n. sp.—Expands 42–52 mm. Palpi, head, thorax and abdomen fuscous gray, the thorax more mixed with black scales; antennæ dark fuscous; fore wings gray, somewhat washed with fuscous, and marked with various black cross-lines: the first basal broken, the next close to the first, rounded, broad near middle, the next one-third out, and rather an intermitted band showing in a broad blackish spot subcostally and next to inner margin; the next line is about the middle, narrow, quite distinct, rounded outwardly at submedian,

dentate outward on vein 2, with a deep sinus following, then rounding out to inner margin; another line subparallel, but not so irregular, beyond this: finally one beginning at a blackish spot on costa, strongly dentate on veins to middle, then faint and quite straight to within posterior angle: hind wings fuscous gray, veins a little darker, a faint lighter band beyond middle, the wings becoming dark fuscous outwardly; marginal line on fore wings black, broken, the fringes checkered; on hind wing marginal band present, continuous, fringes interlined; beneath dark cinereous, the markings above reproduced, but less definitely.

Colorado, from Mr. Bruce, also from California and Washington.

### 42. XANTHORHÖE Hüb.

Verz. 327, 1818 (*Petrophora* Hüb. Tentamen 1810).

Type *montanata* Bork.

*Calostygia* Hüb., Verz. 328, 1818, type *turbata* Hüb.
*Melanydris* Hüb., Verz. 329, 1818, type *incursata* Hüb.
*Plerocymia* Hüb., Verz. 330, 1818, type *cervinata* Schiff.
*Amœba* Hüb., Verz. 333, 1818, type *viridaria* Fab.
*Ochyria* Hüb., Verz. 334, 1818, type *quadrifasciaria* Clerck.
*Onychia* Hüb., Verz. 334, 1818, type *peribolata* Harv.
*Scotopteryx* Hüb., Verz. 338, 1818, type *coarctata* Hüb.
*Ortholitha* Hüb., Verz. 338, 1818, type *plumbaria* Fab.
*Mesotype* Hüb., Verz. 338, 1818, type *parallelaria* Hüb.
*Eubolia* Dup., Hist. Nat. viii, 162, 1829, type *limitata* Scop.
*Larentia* Dup., Hist. Nat. viii, 358, 1829, type *cervinata* Schiff.
*Zerynthia* Curt., Brit. Ent. 296, 1830, type *didymata* L.
*Cymazonita* Sodof., Bull. Imp. Soc. Mosc. 126 1837, type *montanata* Bork.
*Eusebia* Dup., Cat. Meth. 249, 1844, type *bipunctaria* Schif.
*Coremia* Guen., Phal. ii, 408, 1857, type *munitata* Hüb.

Palpi moderate, porrect; tongue developed; clypeus smooth, or slightly tufted; antennæ of ♂ bipectinate, of ♀ filiform; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with all spurs; fore wings 12 veins, two accessory cells, 6 shortly stemmed with 7 or separate; hind wings 8 veins, 8 with cell to beyond middle

Species:—

*X. volucer* Hulst, n. sp.
*X. incursata* Hüb.
*X. abrasaria* H.-Sch. [*Gn.*)
*X. multilineata* Pack. (implicata
*X. illocata* Hulst, n. sp.
*X. borealis* Hulst, n. sp.
*X. nemorella* Hulst, n. sp.
*X. algidata* Moesch.
*X. munitata* Hüb.
*X. ferrugata* Hüb.
*X. unidentaria* Haw.
*X. montanata* Haw.
*X. convallaria* Guen.
*X. defensaria* Guen.
*X. fluctuata* L.

**X. borealis** n. sp.—Expands 26 mm. Antennæ blackish; head fuscous brown, reddish at summit; thorax and abdomen dark fuscous. Wings dull fus-

cous ochreous; base dark brown, and a central broad band of the same color. The central band evenly rounded within, and the basal portion rounded without, the ground color between having its sides subparallel and nearly as wide at costa as at inner margin; outer edge of central band somewhat sinuous wavy, the band itself being nearly as broad at inner margin as at costa, an outer scalloped line brown, the teeth inward; faint indications of submarginal wavy lines; hind wings same color as fore wings with the wing to middle considerably darker; faint indications of outer wavy lines; discal spots black, distinct on all wings, somewhat elongate on fore wings; underneath fuscous, the inner half of all wings darker: discal spots as above.

Alaska.

**X. nemorella** n. sp —Expands 31 33 mm. Head, thorax and abdomen dark fuscous ochreous. Wings smoky ochreous, with a band of chocolate-brown on fore wings near middle. This band is evenly rounded within, sinuous without, three to four times broader at costa than at inner margin: faint indications of submarginal wavy shades; hind wings without band, but with faint wavy shadings; discal spots wanting on hind wings, and scarcely or not at all evident on fore wings; veins on fore wings brokenly lined with black; beneath as above, with a strong reddish shading, the central band faintly showing on fore wings, and a faint dentated central line on hind wings.

California; Alaska; Aleutian Islands. Very much like the preceding species, but with fore wings more pointed and subfalcate, larger, and with a differently shaped central band.

**X. illocata** n. sp.—Expands 30-32 mm. Head fuscous; thorax and abdomen fuscous cinereous; fore wings pointed, somewhat falcate, light cinereous, with a smoky washing; fore wings without band, in some specimens without indications of one, in others with outer lines of a central band present, black, wavy on both sides, more separate at costa than at inner margin: hind wings unicolorous, discal spots faint or absent on all wings; beneath color as ground color above without markings.

Alaska; Oregon. This is closely allied with the two preceding. My material is not very large, and it is possible that with more material they may be found to intergrade. *X. nemorella* has superficially very much the same appearance as *Zenophleps lignicolorata* Pack., though the band of the fore wings is much more distinct.

**X. volucer** n. sp.—Expands 30-34 mm. Palpi ocher fuscous or blackish; front and thorax ocher fuscous, or fuscous gray. Abdomen ochreous; fore wings mouse-gray to ocher gray, darker narrowly along costa, unicolorous, except a broad outer lightening of color beginning at costa extending backward to vein 5, then making almost a right angle inward, gradually fading from costa and becoming lost beyond the angle: hind wings color of fore wings, or a shade lighter, unicolorous, or with a faint dentate black line running from middle of inner margin subparallel with outer margin and on submarginal space; beneath much as above on fore wings, but the marginal field darker; costal edge at base jet black, and an indication of a black line at costa within outer band, which is

fainter than above; hind wings mouse-gray, veins at cell some marked with black scales; an outer black line beginning at middle of inner margin ringing outwardly subparallel with outer margin, with outward teeth on veins becoming broken, indistinct and deeply dentate on veins towards anterior margin.

New Mexico; Arizona; Colorado. The New Mexico specimen from Mr. Cockerell taken at Santa Fé in July.

### 43. **LOXOFIDONIA** Pack.

Geom. Moths, 213, 1876.

Type *acidaliata* Pack.

*Thyone* Meyr, Tr. N. Zeal. Inst. xvi, 61, 1883, type *abrogata* Walk.
*Asaphodes* Meyr, Tr. N. Zeal. Inst. xviii, 184, 1885, type *abrogata* Walk.

Palpi long, porrect, long rough scaled, or hairy; tongue developed; front rough scaled; antennæ of ♂ bipectinate; thorax and abdomen rough scaled or hairy, untufted; hind tibiæ with all spurs. Wings broad, even; fore wings 12 veins, one accessory cell, 5 nearer 6 than 4 in type; hind wings 8 veins, 8 with cell almost its whole length.

The synonyms are given on authority of Mr. Meyrick.

Species.—*L. acidaliata* Pack.
*L. frigidaria* Guen.

## MONOCTENIINÆ.

### Synopsis of Genera.

1. Antennæ of ♂ bipectinate ..... 2.
   Antennæ of ♂ not bipectinate ..... 2. **Synomila.**
2. Fore wings 7 stemmed with 8 ..... 3.
   Fore wings 7 separate from 8 ..... 1. **Melanomma.**
3. Antennæ of ♂ with fascicles of hairs on short pectinations ..... 4. **Paota.**
   Antennæ of ♂ with long pectinations without fascicles of hairs. 3. **Hæmatopsis.**

### 1. **MELANOMMA** Grt.

Tr. A. E. S. 5. 117, 1875.

Type *auricinctarium* Grt.

Palpi long, slender, erect, or strongly ascending, end member longer than usual; tongue developed; antennæ of ♂ bipectinate, of ♀ filiform with a spinous hair from summit of each segment; hind tibiæ with all spurs; 12 veins, 6, 7, 8, 9, 10 and 11 separate, 6 below middle of cell, 12 free; hind wings, 3 and 4 short stemmed; 5 near to 4, 6 and 7 stemmed, 8 shortly joined to cell at base, diverging almost Sterrhid like.

I place this genus here doubtfully, as I am not altogether sure it is a Geometer. The venation of the hind wings is about as much like that of the Sterrhinæ as of this subfamily, but, in other respects while peculiar, it seems better placed here. I have no ♂, and can give only the character of the ♂ antennæ, which was the only structual character of the ♂ given by Mr. Grote.

Species.—*M. auricinctarium* Grt.

### 2. **SYNOMILA** n. gen.

Type *subochreata* Hulst.

Palpi short, slender; tongue obsolete; front flat; antennæ filiform pubescent in both sexes; hind legs without spurs, weak, somewhat aborted in ♂; fore wings one accessory cell, 12 veins, 6 separate; hind wings 8 veins, 3 and 4 separate, 6 and 7 stemmed, 8 with cell nearly to middle.

Species.—*S. subochreata* Hulst.

### 3. **HÆMATOPSIS** Hüb.

Verz. 301, 1818.

Type *grataria* Fab.

Palpi short, slender; tongue developed; front bulging, flattened; antennæ strongly bipectinate in ♂, simple in ♀; hind tibiæ with two pairs of spurs in both sexes; fore wings, one accessory cell, 12 veined, 6 separate; hind wings 8 veins, 3 and 4 separate, 6 and 7 stemmed; 8 joined with cell, but separating before middle.

Species.—*H. grataria* Fab.

### 4. **PAOTA** n. gen.

Type *fultaria* Grt.

Palpi moderate, slender, porrect; front flattened, scaled, untufted; tongue developed; antennæ shortly bipectinate in ♂, with a fascicle of hairs on each pectination; hind tibiæ with all spurs; fore wings 12 veins, one accessory cell, 6 and 7 separate; hind wings 8 veins, 3 and 4 separate, 6 and 7 stemmed, 8 joined with cell nearly to middle.

Species.—*P. fultaria* Grt.

## STERRHINÆ.

The Sterrhinæ are a group separated by the peculiar merging of vein 8 of hind wings with the cell. They are, in the main, small, frail insects, and in the more specialized forms show decided pecu-

liarities. A very common, and perhaps the most remarkable of these, is the tendency of the hind legs to obsolescence, in part or as a whole. The spurs are often partly or altogether absent. Sometimes the hind tibiæ are largely developed with heavy hair pencil in the males, the tarsi being much shortened, and again the whole leg is sometimes practically obsolete in the males. The development seems to have been as follows: The hair pencil has developed on the hind tibiæ, and, with its increased development and use for ornamentation, the spurs and tarsi have been absorbed, so that the hind legs have become useless for their normal purpose. A change of development then seems to have taken place; the pencil has been gradually aborted, and the leg being useless for its normal purpose has tended to become obsolete. I have found no instance where the leg is absolutely wanting, but there are many where it is very decidedly reduced. This tendency, also shown among the Geometrinæ, is, so far as I know, unique among the Lepidoptera.

In this family the tongue is always developed, the fore tibiæ are never clawed, and the clypeus never tubercled. The venation of the fore wings is to an extent variable, but the number of accessory cells is rarely subject to variation. A peculiar feature is the abnormal and deltoid development of the palpi in a few species.

Of the typical genus *Sterrha* Hüb., of which *Acidalia* Treit. is a synonym, I have as yet found no representative in our fauna.

## STERRHINÆ.

### Synopsis of Genera.

1. Hind tibiæ of ♀ with upper spurs present ..... 2.
   Hind tibiæ of ♀ with upper spurs absent ..... 13.
2. Hind tibiæ of ♂ with end spurs present ..... 3.
   Hind tibiæ of ♂ with end spurs absent ..... 9.
3. Hind tibiæ of ♂ with upper spurs present ..... 4.
   Hind tibiæ of ♂ with upper spurs absent ..... 6.
4. Palpi long ..... 5.
   Palpi moderate ..... 1. **Calothysanis.**
5. Palpi very long, deltoid; fore wings 10 on 9 ..... 5. **Mycterophora.**
   Palpi long, fore wings 10 on 11 ..... 4. **Prosaparia.**
6. Antennæ of ♂ bipectinate ..... 7.
   Antennæ of ♂ not bipectinate ..... 8.
7. Fore wings with accessory cell ..... 7. **Leucophthalmia.**
   Fore wings without accessory cell ..... 6. **Deptalia.**
8. Fore wings with accessory cell ..... 10. **Cinglis.**
   Fore wings without accessory cell ..... 17. **Sigela.**

9 Fore wings with no accessory cell, or one only.....10.
Fore wings with two accessory cells.....11.
10. Abdomen of ♂ tufted laterally at end.....8. **Synelys.**
Abdomen of ♂ not tufted laterally at end.....13. **Leptomeris.**
11. Fore wings extended, acute; hind wings strongly angulate.....2. **Pigia.**
Fore wings normal; hind wings rounded.....12.
12. Hind wings with fringe of hairs beneath at base of vein 8.
11. **Scelolophia.**
Hind wings with no such fringe.....12. **Charommatæa.**
13. Hind tibiæ of ♂ with end spurs present.....15. **Emmiltis.**
Hind tibiæ of ♂ with end spurs absent.....14.
14. Antennæ of ♂ bipectinate.....9. **Xystrota.**
Antennæ of ♂ not bipectinate.....15.
15. Middle and hind legs fringed with hairs.....16. **Ptenopoda.**
Middle and hind legs not fringed with hairs.....16.
16. Hind wings of ♂ with hair fringe along inner margin.....17.
Hind wings of ♂ without such fringe.....18.
17. Fore wings 8 veined.....19. **Goniacidalia.**
Fore wings 12 veined.....18. **Lophosis.**
18. Hind wings rounded inwardly at vein 5.....3. **Eucidalia.**
Hind wings not rounded inwardly at vein 5.....14. **Eois.**

### 1. **CALOTHYSANIS** Hüb.

Verz. 301. 1818 (*Erastria* Hüb., Tentamen 1810).

Type *amata* Linn.

*Bradypetes* Steph., Cat. 128, 1829, type *amata* L.
*Timandra* Dup., Hist. Nat. viii, 224, 1829, type *amata* L.

Palpi short, slender; face flat; tongue developed; antennæ strongly bipectinate; hind tibiæ with two pairs of spurs in both sexes; fore wings, one accessory cell, 12 veins, 6 separate, 11 from cell; hind wings, 8 veins, 6 and 7 separate or stemmed, 8 shortly joined with cell near base then rapidly diverging.

Species.—*C. amaturaria* Wlk.
*C. viridipennaria* Guen.

### 2. **PIGIA** Guen.

Phal. ii, 19, 1857.

Type *tergeminaria* H.-Sch.

Palpi moderate, porrect, rather stout; tongue developed; front flat, narrow; antennæ of ♂ simple, with fine fascicles of hairs, 4 on each segment; hind tibiæ of ♂ without spurs, swollen, with strong hair pencil, tarsi nearly aborted; hind tibiæ of ♀ with two pairs of spurs; fore wings, 12 veins, two accessory cells, 6 separate; hind wings, 8 veins, 3 and 4 separate, 6 and 7 separate or stemmed, 8

shortly joined with cell then rapidly diverging; fore wing with apex extended, acute; hind wings quadrate with strong angle at vein 4 on outer margin.

Species.—*P. multilineata* Hulst.

### 3. EUACIDALIA Pack.

Fifth Report Peab. Acad. Sci. 69, 1873.

Type *sericeata* Pack.

Palpi moderate, slender, ascending; front smooth; antennæ of ♂ dentate ciliate; hind tibiæ of ♂ without spurs, without hair pencil, very weak and partially aborted, of ♀ with end spurs only; fore wings 12 veins, 6 separate, 10 on 9, 11 from cell; hind wings 8 veins, 6 and 7 stemmed; the outer edge of the wing is rounded in at vein 5, and again more slightly just above anal angle, this latter being more decided in the ♀ than in the ♂.

Very near to *Eois*, and distinguished only by the inner sinus of the hind wings at vein 5.

Species.—*E. sericeata* Pack.

### 4. PROSAPARIA Grt.

Can. Ent. xv. 130. 1883.

Type *perfuscaria* Grt.

Palpi very long, projected forward, porrect or subascending; clypeus flat, close scaled; antennæ of ♂ bipectinate; tongue obsolete; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with two pairs of spurs; fore wings apex pointed, outer margin even, two accessory cells, 12 veins, 3 and 4 separate, 5 near 4, 6 separate, 7 separate, 8 stemmed with 9, 10 stemmed with 11, 12 separate; hind wings 8 veins, 3 and 4 separate, 5 near 4, 6 and 7 separate, 8 joined with cell shortly, then rapidly diverging.

Species.—*P. fuscaria* Grt.

### 5. MYCTEROPHORA n. gen.

Type *monticola* Hulst.

Palpi very long, deltoid like, slender, porrect, second member much the longest; tongue developed; antennæ strongly bipectinate in ♂, ciliate in ♀; front with loose hairs, scarcely tufted; hind tibiæ with two pairs of spurs; fore wings one accessory cell, 12 veins, 3 and 4 separate, 5 nearer 4 than 6, 6 separate from 7, 11 from cell separate from accessory cell; hind wings 8 veins, 3 and 4 separate, 5 nearer 4 than 6, 6 and 7 short stemmed, 8 shortly joined to cell, then rapidly diverging.

An aberrant genus, distinguished by the extraordinarily long palpi, which are much more extended than in any other American genus. I have only the ♂ of one species, and only the ♀ of the other, but as far as these give characteristics they are congeneric.

Species.—*M. monticola* Hulst, n. sp.
*M. longipalpata* Hulst, n. sp.

**M. monticola** n. sp.—Expands 32 mm. Palpi grayish black, ascending slightly, round, with loose projecting scales, end member black at base, blackish gray at end; front black, loosely scaled; summit buff colored; antennæ of ♂ black; thorax buff colored. Legs blackish, mixed with ocher, becoming ochreous at ends of joints; fore wings buff color, with an intermixing of fuscous scales, the color quite even over all wings; a basal black cross-line angulated at middle; a broad black cross-line at middle of wing, even, rounded on cell; an outer black cross-line narrower than the preceding, and nearly parallel with it, shortly dentate its whole length; the outer field slightly shaded: marginal line black; a black spot on cell half way between basal and middle cross lines, much further towards base than the ordinary position of the discal spot; hind wings with the lines of the fore wings continued, except that the basal is obsolete; the outer edge of the wings somewhat wavy: beneath faintly showing the markings above; colors all lighter.

Sierra Nevada, California.

**M. longipalpata** n. sp.—Expands 26 mm. Palpi dark gray, lighter towards base, rounded with loose scales; front black, summit gray; antennæ interlined, light gray and blackish; thorax fuscous gray; fore wings fuscous, pretty evenly sprinkled with blackish scales giving a dark fuscous gray color, there are also a few scattered scales of a violet-red color, these being more prevalent at base of fore wings, within discal spot, and over the middle and outer field of hind wings giving a faint violet shading to the wings; fore wings with a broken black basal line, a broken middle band, and a more distinct extra-discal line, narrow, black, broadly rounded at cell, wavy scalloped; a black spot on cell between first and second lines; marginal line black; hind wings with outer and marginal lines of fore wings; discal spot large, black, lengthened; both the fore and hind wings have waved outer margins; beneath as above, lighter and fainter.

Soda Springs, Siskiyou County, California. From Mr. Behrens, July 19.

### 6. **DEPTALIA** n. gen.

Type *insularia* Guen.

Palpi erect, reaching above head; tongue developed; front rounded, short scaled; antennæ strongly bipectinate in ♂; hind tibiæ of ♂ with only end pair of spurs present, not swollen, without hair pencil; hind tibiæ of ♀ with both pairs of spurs present; fore wings without accessory cell, discal cell short, 12 veins, 3 and 4 from a point, 6 separate, 7, 8, 9, 10 and 11 on one stem; a tufting of long scales

at base of wing on subcostal vein; hind wings 8 veins, cell short, triangular, 3 and 4 stemmed, 6 and 7 stemmed, 8 shortly joined with cell near base, then rapidly diverging.

Species.—*D. insularia* Gn.

### 7. LEUCOPHTHALMIA Hüb.

Verz. 302, 1818 (*Cyclophora* Hüb., Tentamen 1810).

Type *annulata* Schif.

*Cyclophora* Hüb., Verz. 302, 1818, type *annulata* Schlz.
*Cosymbia* Hüb., Verz. 302, 1818, type *pupillaria* Hüb.
*Codonia* Hüb., Verz. 302, 1818, type *punctaria* L.
*Pyctis* Hüb., Verz. 309, 1818, type *trilinearia* Bork.
*Ephyra* Dup., Hist. Nat. viii, 20, 1829, type *pendulinaria* Cl.
*Zonosoma* Led., Z. B. Ges. Wien, 194, 1853, type *pendulinaria* Cl.

Palpi moderate, subascending, slender; front smooth; antennæ of ♂ bipectinate, of ♀ filiform; hind tibiæ of ♂ with end spurs only not swollen and without hair pencil; hind tibiæ of ♀ with all spurs present; fore wings 12 veins, one accessory cell, 6 separate, 11 from cell; hind wings 8 veins, 3 and 4 separate, 6 and 7 stemmed, 8 shortly joined with cell, then rapidly diverging.

Mr. Meyrick calls this genus *Leucophthalmia*. *Cosymbia* is printed before it in the Verzeichniss, and so has priority in location, but under the rules the choice of Mr. Meyrick must be followed. *Cyclophora* is preoccupied in the Molusca.

Species:—

*C. myrtaria* Guen.
*C. culicaria* Guen. [Guen.)
*C. lumenaria* Hüb. (pendulinaria
*C. serrulata* Pack.
*C. dataria* Hulst.
*C. albocostaliata* Pack.
*C. pannaria* Guen.

### 8. SYNELYS n. gen.

Type *ennucleata* Guen.

Palpi short, porrect; tongue developed; front flat, short scaled; antenne dentate fascicled in ♂, ciliate in ♀. Abdomen of ♂ with small pencil of hairs laterally on last segment; hind tibiæ of ♂ lengthened, swollen, with hair pencil, without spurs, tarsi very short and small; of ♀ with two pairs of spurs, not swollen; fore wings 12 veins, one accessory cell, 6 widely separate, 10 on 9, 11 from cell; hind wings 8 veins, 6 and 7 separate, the wings with an angle at end of vein 4.

Species:—

*S. ennucleata* Gn. [*Wlk.*)
*S. alabastaria* Hüb. (reconditaria
*S. timandrata* Wlk.
*S. ordinata* Wlk.
*S. subquadrata* Gn.
*S. umbilicata* Gn.

### 9. **XYSTROTA** n. gen.

Type *hepaticaria* Guen.

Palpi short, porrect; front smooth; antennæ of ♂ bipectinate with fascicle of hairs at end of each pectination; hind tibiæ of ♂ without spurs or hair pencil, the whole leg almost obsolete; hind tibiæ of ♀ without median spurs; fore wings 12 veins, 10 out of 9, two accessory cells; hind wings 8 veins, 6 and 7 stemmed.

Species. – *X. hepaticaria* Guen.

### 10. **CINGLIS** Guen.

Phal. ii, 114, 1857.

Type *humifusaria* Evers.

Palpi moderate, porrect, rough scaled; face smooth; antennæ of ♂ bipectinated, pectinations short, ending in fascicles of long cilia; thorax glabrous beneath; femora glabrous; posterior tibiæ of ♂ without median spurs, slender; of ♀ with all spurs present; fore wings 10 out of 9, 11 anastomosing with 9; hind wings 6 and 7 stemmed.

This is Mr. Meyrick's description of the genus. I have not seen the type.

Species:—

*C. luteolata* Hulst.
*C. similaria* Walk.
*C. quadrilinearia* Pack.
*C. purata* Gn.
*C. compensata* Wlk.
*C. ancellata* Hulst.
*C. fuscata* Hulst.
*C. albidula* Hulst, n. sp.

**C. albidula** n. sp.—Expands 21 mm. Palpi whitish below, blackish above; front blackish; thorax and abdomen white; all wings pure snow-white, with a few scattered black scales intermixed; fore wings with a faint blackish basal line, not on hind wings; also, and continued on the hind wings, an intra-discal scalloped line, dentate outwardly on veins where the black is emphasized; this is slightly rounding in its course on both wings; on the hind wings the black discal point is outwardly in one of the scallops; a submarginal, slightly wavy, dentate black line, parallel with outer margin, and on hind wings as well; marginal line fine black; discal spots on all wings, fine, black; beneath as above, more faintly revealing the cross-lines.

S. Florida. From Mrs. Slosson.

### 11. **SCELOLOPHIA** n. gen.

Type *formosa* Hulst.

Palpi short, slender; front closely scaled; antennæ subdentate, fascicled ciliate; thorax even. Abdomen even, tufted laterally on last segment, and with strong hair tufts on second and third segments

below; hind tibiæ in ♂ short, without spurs, with strong hair pencil, and the whole tibia with a fringe of hair; tarsi short. Wings even, the hind wings below with a fringe of hairs bent backward at base of vein 8, and a smaller fringe at vein 1*a*.

I have the ♂ only, and can give a diagnosis from it alone.

Species.—*S. formosa* Hulst, n. sp.

**S. formosa** n. sp.—Expands 18 mm. Palpi ochreous, with a reddish tinge; front dull reddish ochreous; thorax light violet lavender. Abdomen ochreous: fore wings light violet lavender, with some scattered blackish scales; fore wings with costa dull red; cross-lines broad, faint, yellow ocher, one intra-discal, a second extra-discal, a third outer, and a fourth submarginal; the outer line is undulate with a rounding outward at cell and vein 2; the submarginal line runs into the outer margin at vein 3; margin rather darker reddish; hind wings corresponding to fore wings, but third line becomes submarginal, and fourth line is wanting, all very faint as in fore wings; beneath fore wings light reddish ochreous, hind wings yellow ocher at base, light ocher outwardly.

Texas.

### 12. CHAROMMATÆA n. gen.

Type *ella* Hulst.

Palpi moderate, porrect, rather stout, long scaled below; tongue developed; front close scaled, smooth; antennæ simple, fascicled ciliate; thorax and abdomen smooth; hind tibiæ of ♂ swollen, rather short, with pencil or fringe of long fine hairs clothing inner side; no spurs present; upper tarsus swollen, lengthened; also edged with long fine hairs, end tarsi slightly developed; hind tibiæ in ♀ with two pairs of spurs; fore wings rounded, even, two accessory cells, 12 veins, 6 separate from 7; hind wings rounded, with a slight tendency to angulation at vein 4, 8 veins, 3 and 4 separate or at a point.

Easily known by the unique shape and pencilings of the hind legs in ♂. The only species is very different in coloration from any of our other species, and would scarcely be taken for a Sterrhid.

Species.—*C. ella* Hulst, n. sp.

**C. ella** n. sp.—Expands 25–30 mm. Palpi dull purple reddish; front dull reddish; thorax bright golden-yellow. Abdomen fuscous yellow. Wings bright clear yellow; fore wings with faint, rather broad blackish basal line showing in three or four spots; a faint extra-discal line, and an outer row of spots showing between the veins; this is followed by a submarginal band of spots, larger and more strongly marked, the ones at anal angle and middle of the wings being much larger and more distinct; a marginal row of black dots between the veins; discal spot large, round, distinct, blackish; hind wings with the lines of the fore wings continued, except basal line; beneath as above, but washed with purple reddish.

Central Texas. Very different in appearance from any other Sterrhid, and a most beautiful insect.

**C. ella** var. *ellatina* n. var.

I have specimens from San Antonio, Texas, where the brilliant golden yellow is buff with a reddish tinge, with the lines more distinct, and the red below more decided, and to them I give this varietal name. They have quite a distinct appearance.

### 13. LEPTOMERIS Hüb.

Verz. 310. 1818.

Type *umbellaria* Hüb.

*Craspedia* Hüb., Verz. 312, 1818, type *ornata* Scop.
*Dosithea* Dup., Hist. Nat. viii, 43, 1829, type *ornata* Scop.

Palpi short or moderate, subascending; face smooth; antennæ serrate, or dentate fascicled; hind tibiæ of ♂ swollen, long, with hair pencil, without spurs; of ♀ with all spurs; hind tarsi of ♂ short, weak; fore wings 12 veined, 10 out of 9, 11 from cell anastomosing with 9; hind wings with 6 and 7 separate or stemmed.

Species:—

*L. gemmata* Pack. [*Hulst.*)
*L. laretaria* Hüb. (minutularia
*L. occidentata* Pack.
*L. lævitaria* Hüb. (floridata *Pk.*)
*L. roseotincta* Hulst, n. sp.
*L. æmulata* Hulst, n. sp.
*L. quinquelinearia* Pack.
*L. sentinaria* Hüb.
*L. magnetaria* Gn.
*L. frigidaria* Moesch.
*L. ostentaria* Walk.
*L. plantagenaria* Hulst.

**L. roseotincta** n. sp.—Expands 18 mm. Palpi reddish ocher; front and thorax reddish ocher. Abdomen ocher, with a reddish tinge, the segments interlined with blackish. Wings bright straw-yellow, basal field on all wings reddish pink, and on all wings an outer rather broad band of the same color, irregular on margins: on fore wings there is an extension outwardly to outer margin between veins 3 and 4, and the same on hind wings from veins 2 to 4; beneath as above exactly, and just as bright in color. Legs white or ocher, tinged with reddish.

Florida.

**L. æmulata** n. sp.—Expands 18-20 mm. Palpi dark fuscous, black at end; front blackish; summit ocher; thorax ocher to whitish, with a few black scales intermixed. Abdomen whitish at base, becoming ocher posteriorly, and with blackish interlinings; all wings dull clay-white with an ocher tinge, powdered slightly with loose, scattered, blackish scales; fore wings with a faint, dark fuscous, extra-discal band, subparallel with outer margin, generally obsolete anteriorly, more definite towards inner margin; submarginal space fuscous, more decided towards anal angle with an inner row of black dots on veins, and an included wavy lighter line, marginal spots black; hind wings with the bands and lines of fore wings continued, but darker and more distinct; all discal spots black,

distinct: beneath as above, the black powdering more dense and distinct and the darker bands more emphasized.

Charlotte Harbor, Florida, from Mrs. Slosson, taken in March. The specimens are not bright in color and may have hibernated. The species is in appearance very much like *Cinglis compensata* Wlk.

### 14. EOIS Hüb.

Verz. 308, 1818.

Type *muricata* Hufn.

*Arrhostia* Hüb., Verz. 311, 1818, type *aversata* L.
*Ptychopoda* Steph., Cat. 150, 1829, type *dilutaria* Hüb.
*Hyria* Steph., Cat. 150, 1829, type *muricata* Hüb.
*Carphozera* Riley, Insect Life, iv, 112, 1892, type *ptelearia* Riley.

Palpi short or moderate, rather slender; front smooth; antennæ serrate or dentate in ♂, with fascicles of hairs; hind tibiæ without spurs in ♂, the whole leg more or less aborted, tibiæ with hair pencil; in ♀ middle spurs wanting; fore wings 12 veins, 10 on 9, 11 from cell; hind wings 8 veins, 6 and 7 stemmed or rarely separate.

Species:—

*E. parvularia* Hulst.
*E. ptelearia* Riley.
*E. scintillaria* Hulst. [*Pack.*)
*E. demissaria* Hüb. (ferrugata
*E. hilliata* Hulst.
*E. flavescens* Hulst, n. sp.
*E. mierophysa* Hulst, n. sp.
*E. delicata* Hulst, n. sp.
*E. peralbata* Pack.
*E. longipennata* Pack.
*E. nimbicolor* Hulst, n. sp.
*E. ossularia* Hüb.
*E. granitata* Pack.
*E. lanceolata* Hulst, n. sp.
*E. balistaria* Hüb. (perirrorata
*E. rufescens* Hulst, n. sp. [*Pack.*)
*E. pallida* Hulst, n. sp.
*E. eburneata* Guen.
*E. lacteolata* Lint. [briata *Pk.*)
*E. obfustaria* Walk. (punctofim-
*E. volucrata* Hulst.
*E. quæsitata* Hulst.
*E. rotundopennata* Pack.
*E. inductata* Guen.
*E. productata* Pack.
*E. australis* Hulst, n. sp.
*E. sideraria* Guen. [*Pack.*)
*E. anticaria* Walk. (subalbata
*E. basipunctaria* Walk.
*E. refractaria* Walk.
*E. albifera* Walk.

**E. flavescens** n. sp.—Expands 20 mm. Palpi ocher; front fuscous ocher; thorax, abdomen and all wings light ocher; the fore wings are slightly darker basally along costa, and there is a very faint, slightly darker outer rounded line; discal spot very faint on fore wings, smaller, more distinct on hind wings, blackish; beneath as above, the outer line of fore wings showing a little more plainly.

Locality unknown, but from the United States, and probably from Texas.

**E. microphysa** n. sp.—Expands 14 mm. Palpi and front jet black; summit between the antennæ pure white; collar blackish; thorax dark gray. Abdomen dark gray, interlined with blackish; all wings light gray, very thickly powdered with blackish and fuscous scales giving a general dark gray color, this varying in intensity a little, and thus showing faintly a broad extra basal band running nearly parallel with outer margin, also a slight lightening into a submarginal shading parallel with margin, the hind wings continuing these; discal spots blackish, fairly distinct; beneath much as above, but more fuscous and less clear.

Panamint Valley, California. From Dr. Riley, taken by Mr. Koebele on the Death Valley Expedition. In National Museum collection.

**E. delicata** n. sp.—Expands 17 mm. Palpi and front fuscous ocher; thorax ochreous, as is also the abdomen; all wings straw ochreous; fore wings extended, pointed, very rounded at anal angle giving the wings an almost even lanceolate form; a black, rather broad basal line, angulated outwardly on cell, from thence straight to inner margin; a blackish intra-discal band and a black extra-discal line slightly bent outward beyond discal spot and inward near inner margin; a submarginal fuscous cloud, broadest at vein 6 and between veins 3 and 5; hind wings with the middle and outer lines and the submarginal shading of the fore wings continued, the shading broadest between veins 2 and 4, and between 6 and 7; beneath as above, but fainter.

Las Cruces, New Mex., from Mr. Cockerell.

**E. nimbicolor** n. sp.—Expands 17 mm.—Palpi dark fuscous gray; front blackish; thorax gray. Abdomen fuscous gray. Wings even light ash-gray, with three not very distinct black wavy cross-lines, generally showing in scattered black scales, one intra-discal, another extra-discal, rather broad, showing more distinctly at costa and on the wings; a third line outer, finer, very indistinct on fore wings, except at costa; more distinct in black dots on hind wings; discal spot on hind wings faint, on fore wings not evident; below even cinereous.

Florida, taken in April.

**E. lanceolata** n. sp.—Expands 18-20 mm. Very much in coloration and appearance as *Eois nivalis*, the wings scarcely so extended and pointed. Palpi gray, blackish on tip; front and thorax white, with an intermixture of blackish scales. Abdomen white, with interlining of fuscous; all wings white, with scattered fuscous scales a little thicker in spots and lines; a broad intra-discal fuscous cross-line, not very distinct, and the submarginal space fuscous, inner edge even, parallel with outer margin; hind wings with corresponding bands, marginal lines fuscous, narrow, fringes white, with scattered dark scales; beneath as above, more clear and distinct.

Argus Mountains, California, April, from Dr. Riley, and taken by Mr. Koebele on, I believe, the Death Valley Expedition. In National Museum collection.

**E. rufescens** n. sp.—Expands 20 mm. Palpi whitish, fuscous tinged; front the same color; thorax ochreous fuscous. Abdomen ochreous; fore wings rusty ochreous, even in color, with blackish discal spot and faint indications in a light-

ened color of even, straight, submarginal lines, nearly parallel with outer margin; marginal line blackish, fringes white, interlined with black; hind wings dirty light fuscous, with faint shadings of extra-discal darker lines; discal spot blackish; marginal line blackish: fringes white, with blackish scales intermixed; beneath lighter and more clear in color than above, the fore wings powdered with black apically and submarginally, and the hind wings over the whole surface; discal spots clear, distinct.

Austin, Texas. Very near in the shape and character of markings, so far as they are apparent, to *E. perirrorata* Pack.

**E. pallida** n. sp.—Expands 18 mm. Palpi and front jet black; thorax sordid gray. Abdomen gray at base, ochreous posteriorly, with a jet black lateral longitudinal dash on third and fourth segments; antennæ with fascicles of hairs in ♂: all wings whitish, pretty generally sprinkled over with fuscous scales, giving a general dull whitish appearance; fore wings with a broken, indefinite black basal line, another extra-discal, more distinct, but yet broken, rounding at discal spot, irregular, extending within discal spot rather evenly, and more distinct across hind wings: an outer black line, broken, very irregular and indefinite, continued clearly and sharply across hind wings, where it is irregularly and deeply dentate; marginal line of black spots largely obsolete; discal spots black; beneath as above, the lines more indistinct and costa dark fuscous.

Blanco County, Texas.

**E. australis** n. sp.—Expands 26 mm. Palpi fuscous ocher; front black; thorax and abdomen ocher; all wings ocher, slightly washed with fuscous, and with scattered fuscous scales; on the fore wings the fuscous is slightly deepened, giving faint indications of an extra-discal and outer waved cross-lines, which are continued a little more distinctly across hind wings; margins slightly fuscous; beneath as above, slightly lighter in color, with the lines more even and a little more distinct.

Florida, from Mr. E. L. Graef.

### 15. **EMMILTIS** Hüb.

Verz. 309, 1818.

Type *pygmæaria* Hüb.

*Anthometria* Bois., Index Meth. 231, 1840, type *plumularia* Bois.

Palpi moderate, front smooth, or somewhat tufted; antennæ bipectinate in ♂; hind tibiæ of ♂ not swollen, without hair pencil, with end spurs only; of ♀ with end spurs only; fore wings 12 veins, 10 from 9, 11 from cell; hind wings 8 veins, 6 and 7 stemmed.

I do not know that the typical genus *Sterrha* is represented in the United States. It differs from *Emmiltis* in having simple antennæ in ♂. I have only the ♀ of *floridata*, and it is possible the ♂ may show it to belong to *Sterrha*.

Species.—*E. sparasaria* Wlk. (psilogrammaria *Zell.*)
*E. floridata* Hulst.

### 16. **PTENOPODA** n. gen.

Type *miranda* Hulst.

Palpi short, slender; front smooth; antennæ simple, ciliate fascicled; hind tibiæ of ♂ without spurs, long, lined the whole length with a fringe of long hairs, and with a long thick pencil of hairs; middle tibiæ also fringed with long hairs; fore tibiæ very long, considerably longer than femora, very slender, closely scaled; tarsi almost aborted on hind legs, and apparently entirely so on middle legs; fore wings 12 veins, 6 separate, 10 on 9, 11 from cell, one accessory cell; hind wings 8 veins, 6 and 7 stemmed.

Remarkable for the peculiar fringing of the middle and hind tibiæ in ♂, and in this unique so far as I know.

Species.—*P. miranda* Hulst, n. sp.

**P. miranda** n. sp.—Expands 24 mm. Palpi ocher fuscous, black at tip; front black; summit between antennæ, thorax and abdomen basally light ocher, the abdomen becoming ocher fuscous posteriorly; fore wings whitish ocher sprinkled with fuscous scales, but not so plentifully on middle field; a faint sinuous basal line; a broad fuscous line passing just beyond discal spot, wavy sinuate; an outer fuscous line indistinctly dentate, subparallel with outer margin; a submarginal fuscous clouding divided by a lighter colored space; marginal line of black dots; hind wings light ocher with fuscous atoms, extreme base fuscous, and the outer lines and shadings of the fore wings continued; a marginal line of black points; the marginal dots are in all wings in the fringes just at end of veins: hind wings slightly sinused in below anterior angle on outer margin from veins 7 to 5; below as above, but fainter. Legs with fringings bright ocher, the pencil of the hind wings being blackish basally, becoming ocher at ends.

Blanco County, Texas.

### 17. **SIGELA** n. gen.

Type *perumbrata* Hulst.

Palpi moderately long, subascending; front rounded, short scaled; antennæ evenly ciliated with hairs in ♂; a pointed projection inside on summit of basal member in ♂; between the antennæ a smooth flattened scale pad overhanging front; hind tibiæ with two pairs of spurs in both sexes; fore wings without accessory cell, 12 veins, 6 separate, 10 from 9, 11 from cell; hind wings 8 veins, 6 and 7 long stemmed.

A very peculiar, and so far as I know, unique genus, having what seem to be leanings towards the Tineidæ. The overhanging scale tuft on summit of head is very rarely found, *Philagraula* being the only genus I know of, and this is, with some doubt, a Geometer. The projection on base of antennæ is so far as I know unique among

the Geometrina. There is one inner vein only to fore and hind wings, and these are not furcate.

Species.—*penumbrata* Hulst, n. sp.

**S. penumbrata** n. sp.—Expands 14–16 mm. Palpi jet black, front dark fuscous; head tuft and thorax smooth, even mouse-gray. Abdomen dark fuscous gray, slightly interlined with lighter color; all wings blue-gray or light mouse color with a violet tinge in certain lights with three or four indistinct dark spots along costa; in old specimens there is an indication of cross-lines in the more mottled surface, this being more shown extradiscally on hind wings; discal spots fine, black, not very distinct; marginal line dark gray, indistinct, as though the wing edge were black, and this covered over with gray scales and showing through; beneath even light mouse-gray, discal spots and marginal lines faintly showing.

Archer, Fla., March and April, from Dr. Riley, taken by Mr. Koebele.

### 18. **LOPHOSIS** n. gen.

Type *labeculata* Hulst.

Palpi very short, slender; front short scaled; antennæ of ♂ subdentate with fascicles of hairs; fore wings probably with 12 veins; hind wings 8 veins, the inner margin in ♂ with an edging of long coarse hairs near base; hind tibiæ of ♂ without spurs and with strong hair pencil.

The unique specimen of the single species is in poor condition, and I am unable to examine the venation fully. The tufting on the inner margin of hind wings of the ♂ warrants generic separation.

Species.—*L. labeculata* Hulst.

### 19. **GONIACIDALIA** Pack.

Fifth Report Peab. Acad. Sci. 68, 1873.

Type *furciferata* Pack.

Palpi short, slender, front smooth; antennæ simple, evenly ciliate; hind tibiæ of ♂ very weak, the whole leg partially aborted; fore wings 8 veined; 8, 9 and 10 wanting, 5 near 6; or the interpretation may be: 5 wanting, 6 and 7 separate, 7 separate from 8, 9 and 10 wanting; on the inner margin of the wing within vein 2 is a swelling out of the wing modified above into a sort of a fovea covered with enlarged scales; it is probably an incomplete fold; hind wings very much distorted in venation; 6, 7 and 8 present as usual, 6 and 7 stemmed, but the posterior part of the wing formed into a broad fold extending the whole length of the inner margin, the venation being greatly distorted; the fold is edged within with long

hairs and extends beyond the wing, forming an ear-like appearance to the anal angle.

The genus forms a transition to our genera which fall under the Strophidiinæ, but from the characteristic union of vein 8 and the cell of hind wings must be referred to the Sterrhinæ. I do not know the ♀.

Species.—*G. furciferata* Pack.

## STROPHIDIINÆ.

The North American representatives of this subfamily are very few in number, and are quite distinct from the more typical members of the family. In two of the species the hind wings are incised on the outer margin, and in the third the anterior margin on the hind wings is strongly sinuate. The species are without the humeral angle of vein 9 at base of hind wings.

I have hitherto called this subfamily the Microniinæ. Mr. Meyrick calls attention to the fact that *Micronia* Guen. is a synonym of *Strophidia* Hüb., and of course the family name must be based on a genus, not a synonym.

### Synopsis of the STROPHIDIINÆ.

1. Hind wings with fold along inner margin in ♂ ..... 2.
   Hind wings without fold ..... 2. **Calledapteryx.**
2. Hind wings with vitreous spot above at base of cell in ♂ .. 3. **Philagraula.**
   Hind wings without vitreous spot ..... 1. **Callizzia.**

### **CALLIZZIA** Pack.

Geom. Moths, 314, 1876.

Type *amorata* Pack.

Palpi small, porrect or drooping; clypeus flat, scaled; antennæ dentate in ♂, ciliate in ♀, finely pubescent; fore tibiæ unarmed; hind tibiæ swollen, with two pairs of spurs; fore wings no accessory cell, 12 veins, 3 and 4 separate at lower angle of cell, 5 close to 6 at upper angle, 6 and 7 stemmed from angle, 8 and 9 stemmed from anterior part of cell; 10, 11 and 12 separate; hind wings with two notches or angles on outer margin at veins 4 and 7. In ♂ 1 wanting, 3 and 4 from angle, 5 weak, 6 and 7 close, the wing surface extended along inner margin making a hollow fold turned upward; in ♀ venation normal; in both sexes 8 at once broadly diverging from cell.

Species.—*C. amorata* Pack.

## CALLEDAPTERYX Grt.

Trans. Am. Ent. Soc. ii, 119, 1868.

Type *dryopterata* Grt.

Palpi very small, porrect, slender; clypeus flat, closely scaled; antennæ ciliate, slightly flattened. Legs rather short, fore tibiæ unarmed; hind tibiæ swollen, with two pairs of spurs; thorax and abdomen untufted; fore wings arched at base of costa, then somewhat concave, very rounded at apex, angulated at middle, strongly concave on hind margin, 12 veins, no accessory cell, 3 and 4 at lower angle of cell, 5 close to 6 at upper angle, 6 and 7 stemmed from point of cell, 8 and 9 stemmed from anterior part of cell, 10 and 11 from near base; hind wings with two angles on outer border, 8 veins, 3 and 4 stemmed, 5 nearer 6 than 4, 6 and 7 stemmed, 8 at once broadly diverging from cell.

Species.—*C. dryopterata* Grt.

## PHILAGRAULA n. gen.

Type *slossoniæ* Hulst.

Palpi moderate, slender, closely scaled, subascending; clypeus flat, closely scaled with overhanging scale tuft from base of antennæ; antennæ flattened, finely pubescent; thorax and abdomen closely scaled, untufted. Legs short, quite stout, fore tibiæ unarmed, hind tibiæ swollen, with two pairs of long spurs, the upper being the longer; fore wings rounded at apex, nearly even on outer margin, concave on inner margin, no accessory cell, 12 veins, 3 at lower angle of cell, 4 on outer margin of cell below middle, 5 near 6 at angle, 6 and 7 stemmed, 8 and 9 stemmed, 10 close to stem of 8 and 9, 11 from anterior part of cell; hind wings sinuate on outer margin, the outer reaches being at 4, 6 and 7, anterior margin broadly developed near base, 8 veins, 2 from near base of cell, 3 and 4 from angle, 5 from middle of cell, 6 and 7 from angle, 8 at once broadly diverging from cell reaching to apex.

Species.—*P. slossoniæ* Hulst, n. sp.

**P. slossoniæ** n. sp.—Expands 25 mm. Palpi and front inky black; antennæ and antennal tuft a soft ochreous brown; thorax the same color, faintly washed with violet. Abdomen more ochreous. Wings violet-brown, more ochreous on the inner half, all slightly speckled with darker brown scales; fore wings with faint traces of two fine basal lines, with a triangular blackish patch at middle of costa with point reaching one-third across wing, the base being on costa and longest; another smaller corresponding blackish patch opposite along inner margin, the limiting line being inky black, and the spot reaching one-fourth across the wing, its apex being towards the apex of the costal triangle; a dark

marginal subapical spot reaching to middle of outer margin; a faint outer line, wavy, subparallel with margin; hind wings with jet black point a little out from base not far from anterior margin; a sinuate cross-line of reddish brown near middle, edged outwardly with light ochreous; beneath violet-brown with scattered darker scales, with faint indications of two black cross-lines at middle of inner margin on fore wings; fore tibiæ and all tarsi more or less washed with violet-brown.

One ♂, South Florida, from Mrs. Slosson, to whom I respectfully dedicate it.

## GEOMETRINÆ.

The Geometrinæ are very closely related to the Sterrhinæ. They consist of the same small frail insects, with the same aspect, and with, in the main, the same structure. They are, however, generally easily distinguished by their color, which has given them the designation "the greens." While the Sterrhinæ approach the characteristic venation of the Geometrinæ, there is no difficulty in separating them by the position of vein 5 of both wings. These subfamilies seem also to divide on the structure of the antennæ. So far as I have examined the antennæ of the species, which are bipectinate in the male, those of the Sterrhinæ have the pectinations situated upon the bottom of the segments, while those of the Geometrinæ have them upon the top. The Geometrinæ have the same tendency towards the obsolescence of the hind legs already noticed in the Sterrhinæ.

The larvæ, so far as known, are characteristic and peculiar. They are furnished with protuberances on the segments, and have, to some extent, the habit of covering themselves with débris of leaves, thus more effectually concealing themselves.

The family as limited seems to include more specialized forms of other subfamilies. Among our species, apart from the characteristic venation, there are found some with the distinctive venation of the Hydriominæ, some with that of the Sterrhinæ, and some with that of the Ennominæ. They make distinct sections of the subfamily, and I am not entirely sure but that the genus *Annemoria* would better be placed with the Hydriominæ. The subfamily is mostly tropical, and our species are few and rarely plentiful.

I suspect that some of our genera will be found identical with others described from tropical material from both hemispheres, but nothing definite can be determined till types are examined and compared, which I have not had the opportunity of doing. The typical genus *Geometra* I have not found in our fauna. *Anaplodes* is very

close to it, but differs in that the antennæ of the ♂ are not bipectinate to the apex.

## Synopsis of the GEOMETRINÆ.

1. Hind wings 8 separate from cell, Ennomid like.....2.
   Hind wings 8 more or less joined with cell.....4.
2. Hind tibiæ of ♂ with hair pencil.....9. **Aplodes.**
   Hind tibiæ of ♂ without hair pencil.....3.
3. Hind tibiæ of ♂ with two pairs of spurs.....10. **Anaplodes.**
   Hind tibiæ of ♂ with one pair of spurs.....8. **Chlorosea.**
4. Hind wings vein 8 shortly joined with cell, then rapidly diverging, Sterrhid-like.....5.
   Hind wings veins 8 joined with cell one-half its length, Hydriomenid like. 1. **Annemoria.**
5. Hind tibiæ of ♂ with end spurs only.....6.
   Hind tibiæ of ♂ upper and end spurs.....9.
6. Antennæ of ♂ bipectinate.....7.
   Antennæ of ♂ not bipectinate.....3. **Nemoria.**
7. Palpi long in both sexes.....5. **Chloropteryx.**
   Palpi not long in both sexes.....8.
8. Palpi short in ♂ : hind tibiæ of ♂ with hair pencil....2. **Chloroclamys.**
   Palpi short in both sexes; hind tibiæ of ♂ without hair pencil. 4. **Eucrostis.**
9. Palpi long in both sexes.....6. **Racheospila.**
   Palpi long in ♀ only.....7. **Synchlora.**

### 1. ANNEMORIA Pack.

Type *unitaria* Pack.

Palpi moderate, ascending, scaled; clypeus flat, untufted; antennæ of ♂ bipectinate, the pectinations much longer than usual, of ♀ dentate; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with one pair of spurs in both sexes; fore wings even, 12 veins, 3 and 4 from angle, 6 at a point with 7, 10 on 9, 11 from cell, 12, 11 and 10 anastomosing forming subcostal and one accessory cell; hind wings 8 veins, 3 and 4 at angle, 6 and 7 stemmed, 8 with cell one-half or more of its length.

Very peculiar in the Hydriomenid-like union of 8 with cell in hind wings.

Species:—

*A. bistriaria* Pack. *A. graefiaria* Hulst.
*A. faseolaria* Gn. *A. unitaria* Pack.

### 2. CHLOROCHLAMYS n. gen.

Type *chloroleucaria* Guen.

Palpi moderate, end member short in ♂, long in ♀, subascending; front flat, short scaled; antennæ strongly bipectinated in ♂,

ciliate in ♀ ; fore tibiæ unarmed ; hind tibiæ with one pair of spurs in both sexes, in ♂ with long pencil of hairs ; thorax and abdomen untufted ; fore wings 12 veins, 10 on 9, 11 from cell, 12 free or anastomosing with 11 ; hind wings 8 veins, 3 and 4 separate, 6 and 7 stemmed, 8 joining cell near base then rapidly diverging.

Differs from *Euchloris* Hüb. in that the palpi of ♀ are long ; from *Synchlora* Guen. in that there is one pair of spurs only present in both sexes.

Species.—*C. chloroleucaria* Gn.
*C. phyllinaria* Zell.

### 3. NEMORIA Hüb.

Verz. 285, 1818.

Type *viridata* Linn.

*Chlorissa* Steph.. Ill. iii. 315. 1831. type *viridata* L.

Palpi moderate, or rather long, porrect ; clypeus flat, short scaled ; antennæ in ♂ serrate or filiform, in ♀ ciliate or fasciclcd ; hind tibiæ of ♂ without middle spurs, sometimes swollen without hair pencil, of ♀ with both pairs of spurs ; hind tarsi in ♂ sometimes shortened ; fore wings 12 veins, 10 out of 9, 11 from cell ; hind wings 8 veins, 3 and 4 stemmed or separate, 6 and 7 stemmed.

Species.—*N. pistaciata* Guen.
*N. suberoceata* Wlk.
*N. euchloria* Ab. and Gn.

### 4. EUCROSTIS Hüb.

Verz. 283, 1818.

Type *indigenata* Vill.

Palpi short in both sexes, rather ascending, long haired below at base ; clypeus hairy scaled ; antennæ in ♂ with short pectinations ; thorax and abdomen untufted, the thorax rather hairy scaled above, strongly hairy below ; fore tibiæ unarmed, hind tibiæ with one pair of spurs in both sexes, without hair pencil in ♂ ; fore wings 12 veins, 6 separate, 10 on 9 ; 10, 11 and 12 anastomosing ; hind wings 8 veins, 3 and 4 short stemmed, 6 and 7 stemmed, 8 shortly with cell, then rapidly diverging.

Sufficiently distinct from *Chlorochlamys* in that the palpi are short in both sexes, the thorax hairy below, and the hair pencil wanting in the hind tibiæ of the ♂.

Species.—*inornata* Wlk. *operculata* Zell., *grotata* Pack.,
*viridigenata* Hübn, n. sp.

**E. viridipennata** n. sp.—Expands 23–25 mm. Palpi short in both sexes, hairy below at base, white with a smoky tint; front clay ochreous; thorax and abdomen clay ochreous, with a dull greenish shade; fore wings dull even pea-green, without indication of any cross-lines, or with an outer cross-line parallel with margin, even, very faint; the ground color of wing is slightly emphasized on the veins; hind wings color of fore wings, slightly paler basally, without cross-lines; beneath lighter green, even, unicolorous, except that hind wings are a shade lighter basally. Legs clay white, becoming somewhat smoky towards thorax.

Colorado.

### 5. CHLOROPTERYX n. gen.

Type *tepperaria* Hulst.

Palpi porrect, end member long in both sexes; front flat, closely scaled; antennæ bipectinate in ♂, dentate in ♀; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ of ♂ wanting in only specimen I have, the ♀ with two pairs of spurs; fore wings even, 12 veins, 3 and 4 separate, 6 separate, 10 on 9, 11 from cell, 12 anastomosing with 11; hind wings quadrate, with prominent angle at end of vein 4, 8 veins, 3 and 4 stemmed, 6 and 7 stemmed, 8 shortly joined to base, then rapidly diverging.

Species.—*C. tepperaria* Hulst.

### 6. RACHEOSPILA Guen.

Phal. i, 372, 1857.

Type *lixaria* Guen.

Palpi long in both sexes, second member ascending, end member porrect or drooping; clypeus somewhat scale tufted; antennæ bipectinate in ♂, ciliate in ♀; thorax and abdomen untufted; fore tibiæ unarmed, hind tibiæ of ♂ with two pairs of spurs and hair pencil; of ♀ with two pairs of spurs; fore wings 12 veins, 6 separate, 10 on 9, 11 from cell, 12 and 11 anastomosing with each other or separate; hind wings 8 veins, 3 and 4 together from angle, 6 and 7 stemmed, 8 shortly joined with cell near base, then rapidly diverging.

Species:—

*R. lixaria* Gn.
*R. jaspidiaria* Hulst.
*R. xysteraria* Hulst.
*R. hollandaria* Hulst.
*R. saltusaria* Hulst.

### 7. SYNCHLORA Guen.

Phal. i, 375, 1857; *Eunemoria* Pack., 5th Peab. Rept. p. 76, 1873.

Type *liquoraria* Guen.

Palpi short, ascending in ♂; long, porrect or drooping in ♀, the end member especially lengthened; clypeus flat, scaled; antennæ bipectinated in ♂, ciliate in ♀; thorax and abdomen untufted; fore

tibiæ unarmed; hind tibiæ with two pairs of spurs in both sexes; fore wings 12 veins, 3 and 4 at angle, 6 separate, 10 on 9, 11 from cell; hind wings 8 veins, 3 and 4 separate or short stemmed, 6 and 7 stemmed, 8 joined to cell shortly then rapidly diverging, the union being rather longer than usual and the divergence less rapid.

Species:—

*S. glaucaria* Gn.
*S. viridipallens* Hulst, n. sp. [Pk.)
*S. denticulata* Walk. (excurvata
*S. liquoraria* Gn.
*S. rubrifrontaria* Pack.
*S. dominicaria* Gn.

**S. viridipallens** n. sp.—Expands 24-26 mm. Palpi and body parts discolored in relaxing, probably whitish green, the palpi red at end; front red; fore wings vestiture squamose, thin, even dull ocher green without lines; hind wings a lighter unicolorous, scarcely greenish; beneath nearly the color of hind wings above.

Colorado; Arizona.

### 8. CHLOROSEA Pack.

Proc. Bost. Soc. Nat. Hist. xvi, 31, 1874.

Type *nevadaria* Pack.

Palpi scaled, not heavy, subascending; clypeus flat, with a tendency to a scale ridge below; antennæ bipectinated in ♂, ciliate in ♀; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with one pair of spurs in both sexes; fore wings even, no accessory cell, 12 veins, 3 and 4 from angle, 6 from a point or short stemmed with 7, 10 on 9, 11 from cell, 12 separate; hind wings 8 veins, 3 and 4 from angle, 6 and 7 stemmed, 8 separate from cell.

Species.—*C. nevadaria* Pack.

### 9. APLODES Guen.

Phal. i, 376, 1857.

*Hipparchischus* Walsh, Proc. Bost. Soc. Nat. Hist. ix, 300, 1864.

Type *mimosaria* Guen.

Palpi projecting beyond head, long scaled, ascending; clypeus flat, slightly scale tufted below; antennæ ♂ shortly bipectinated; thorax and abdomen untufted; fore tibiæ unarmed, hind tibiæ in both sexes with two pairs of spurs, the lower pair small in ♂; hair pencil on hind tibiæ of ♂; fore wings even, 12 veins, no accessory cell; 3 and 4 from angle, 6 separate from 7, 10 on 9, 11 from cell; hind wings 8 veins, 3 and 4 from a point or short stemmed, 6 and 7 stemmed, 8 separated from cell.

Species.—*A. mimosaria* Gn.
*A. bistriaria* Hüb. (brunnearia *Pack.*)
*A. ærata* Fab.

### 10. ANAPLODES Pack.

Geom. Moths. 392, 1876.

Type *pistacearia* Pack.

Palpi moderate, ascending, rather strong; clypeus untufted; antennæ bipectinated in ♂, ciliate in ♀; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with two pairs of spurs in both sexes, in ♂ not swollen and without hair pencil; fore wings 12 veins, 3 and 4 separate, 6 separate, 10 on 9, 11 from cell; hind wings 8 veins, 3 and 4 from angle, 6 and 7 stemmed, 8 separate from cell.

Differs from *Aplodes* principally in lack of hair pencil on hind tibiæ of ♂; from *Geometra* in that the antennæ of ♂ are not bipectinate to apex. So far as the description goes, *Megalachlora* Meyr. is a synonym. Differs also from *Pseudoterpna* in that the abdomen is not tufted.

Species:—

*A. zygotaria* Hulst.
*A. viridicaria* Hulst.
*A. festaria* Hulst.
*A. pistacearia* Pack.
*A. junctolinearia* Graef. [*Auct.*)
*A. remotaria* Wlk. (iridaria
*A. iridaria* Guen. (rectaria *Grt.*)
*A. illustraria* Hulst.

## BREPHINÆ.

The Brephinæ have in the past very generally been catalogued with the Noctuina, but were recognized to be a connecting link between that family and the Geometrina. Mr. Meyrick was, I believe, the first to regard them as true Geometers, and I myself have the same opinion. There are some Noctuid tendencies, and in many respects the two families are nearly related, but the Geometrid relations seem to me to be the nearer and more decisive.

Mr. Meyrick catalogues these insects under the term Monocteniidæ. The family designation Brephidæ has priority, however, if indeed the two groups should be joined in one family.

As said heretofore I can see no valid reason why certain genera such as *Alsophila*, etc., where vein 8 of the hind wings is coincident with the cell, should be referred to this family, as is done by Mr. Meyrick. They belong more properly to the Hydriomeninæ.

Synopsis of BREPHINÆ.

Antennæ of ♂ bipectinate ..... **Leucobrephos.**
Antennæ of ♂ dentate ..... **Brephos.**

**BREPHOS** Ochs.

Schm. Eur. 1816 (*Brephos* Hüb., Tentamen 1810).

Type *parthenias* L.

*Archiearis* Hüb., Verz. 279, 1818, type *parthenias* L.

Palpi short, covered with long hairs; face clothed with long loose hairs; antennæ simple, rounded, finely pubescent; thorax scaly, mixed with hairs, the patagiæ long haired. Abdomen scaled, mixed with hairs. Legs, femora and tibiæ haired, hind tibiæ with two pairs of spurs, fore tibiæ unarmed; fore wings 11 veins, one accessory cell, 7 absent, 3 and 4 widely separate, 5 at middle of cell; hind wings 8 veins, 3 and 4 separate, 5 at middle of cell, 6 and 7 stemmed, 8 separate from cell and subparallel with it.

Species.—*B. infans* Moesch.

**LEUCOBREPHOS** Grt.

Buff. Bull. ii, 53, 1874.

Type *brephoides* Walk.

Palpi moderate, very lengthily hairy; face hairy; antennæ bipectinate in ♂; thorax and abdomen heavily haired, untufted; fore wings 11 veins, 3 and 4 stemmed, one accessory cell; hind wings 8 veins, 3 and 4 stemmed, 8 separate from cell and subparallel with it.

Species.—*L. brephoides* Wlk.
*L. middendorfi* Men.

## LEUCULIDÆ.

The only genus is the typical one which follows. The venation is peculiar, and I am doubtful whether the species belongs to the Geometrina. It has a decidedly Lithosiid aspect, and its true position cannot be determined until the larva is known.

**LEUCULA** Guen.

Phal. i, 134. 1857.

Type *empusaria* Guen.

Palpi very minute; clypeus flat, scaled; antennæ of ♂ bipectinate; thorax and abdomen untufted; fore tibiæ unarmed; hind tibiæ with two pairs of spurs; fore wings elongate, even, 12 veins, no accessory cell, 3 and 4 widely separate, 5 nearer 4 than 6, 6 from cell near 7, 7 and 8 stemmed from point of cell, 9 and 10 stemmed; hind wings rounded, 3 and 4 widely separate, 5 below middle, 6 and 7 stemmed, 8 separate from cell, but close to it to end.

The generic description is from *L. lacteolata*. I do not know the type of the genus.

Species.—*L. lacteolata* Hulst.

# ENNOMIDÆ.

## FERNALDELLINÆ.

This subfamily erected for, and containing the typical genus only, is a very peculiar one in apparent affinities. In not having vein 5 of the hind wings developed, it is placed with the Ennomidæ as I have defined that family. The structure of the hind wing in the coalescing of vein 8 with the cell at base is exactly that of the Hydriomeninæ. There exists also the comparatively rare peculiarities of the prominent tubercle of the clypeus, the clawing of the fore tibiæ and the bipectinate antennæ of the ♀. The vestiture of the head and thorax is the squamose hairy and scale hairy vestiture of the Arctic Hydriomeninæ, and the coloration approaches most nearly certain genera of the Ennominæ.

### FERNALDELLA n. gen.

Type *fimetaria* Grt.

Palpi moderate, slender, with long scales at base, clypeus having a rounded protuberance with a hollow within, with central roughened raised space; tongue developed; antennæ bipectinated in both sexes; fore tibiæ with a strong terminal frontal claw, the tibiæ themselves very short and stout; hind tibiæ with two pairs of spurs; fore wings 11 veins, 6 from a point with 7, 8 wanting, 10 from 9, 11 from cell; hind wings 7 veins, 3 and 4 separate, 5 wanting in ♂; weak, not tubular in ♀; 6 and 7 stemmed, anastomosing with cell more than one-half its length in ♂, not quite one-half in ♀.

I take great pleasure in dedicating this genus to Dr. C. H. Fernald, of Amherst, Mass., whose ability as an entomologist and worth as a man, command, second to no other, my admiration and respect.

Species.—*F. fimetaria* Grt.
*F. stalachtaria* Streck.

## ENNOMINÆ.

The Ennominæ are the largest of the subfamilies of the Geometrina of our fauna. There is among them, moreover, the widest variation in appearance and structure, and they offer the greatest difficulties in classification.

The subfamily divides into two groups by the possessing or lacking a peculiar fovea on fore wings beneath near the base of vein 1*a* in the male. It is ordinarily easy to be seen, though there is difficulty

in some cases, where the peculiarity seems to be in the process of development, or where perhaps the species is outgrowing it. Sometimes it is large and prominent, consisting of an unscaled vitreous surface, at times with a peculiar gland within it.

There is wide variation in the structure of the antennæ not only in that bipectinate, lamelate, fascicled, ciliate, filiform and flattened forms are found, but also in the location of the various appendages. In many species the pectinations are at the summits, in others at the bases of the segments. The rule is not invariable, but generally the species having the fovea on the fore wings of the males, have also the pectinations or fascicles on the top of the segments of the antennæ.

Apart from the elements of structure upon which the subfamily is founded, there is among the species a very wide range of variation. The palpi, clypeus, antennæ, legs, thorax, abdomen and wings vary greatly; especially is the venation subject to variation not only in the different species, but in the individual species. In view of this, in the main, very little dependence can be placed upon the relations of veins 9, 10, 11 and 12 to each other in the fore wings. Not infrequently an extra vein (vein 13) is found, and very frequently 11 is present or absent in different specimens of the same species; 9, 10, 11 and 12 anastomose with each other, or are separate in the individuals of one species, and as a consequence very little use can be made of them in classification. The position of the bases of the veins are much less variable. The hind wings are less changeable in venation than the fore wings, but the comparative positions of 3 and 4, as well as 6 and 7, cannot be relied upon within narrow limits.

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## Synopsis of Genera.

1. Fore wings of ♂ with fovea below at base of 1a ..... 2.
   Fore wings of ♂ without fovea below at base of 1a ..... 36.
2. Antennæ of ♂ bipectinate ..... 3.
   Antennæ of ♂ not bipectinate ..... 30.
3. Tongue absent, or very short ..... 4.
   Tongue developed, at least one-half thorax ..... 5.
4. Hind tibiæ with one pair of spurs ..... 63. **Nacophora.**
   Hind tibiæ with two pairs of spurs ..... 34. **Amilapis.**
5. Fore wings with discal scale tuft ..... 44. **Tornos.**
   Fore wings without discal scale tuft ..... 6.
6. Clypeus tubercled ..... 7.
   Clypeus not tubercled ..... 11.
7. Fore tibiæ clawed ..... 8.
   Fore tibiæ not clawed ..... 49. **Cœnocharis.**

8. Hind tibiæ with one pair of spurs ..... 9.
   Hind wings with two pairs of spurs ..... 10.
9. Fore wings 11 veins ..... 46. **Synglochis.**
   Fore wings 12 veins ..... 48. **Holochroa.**
10. Fore tibiæ rounded, with one claw at end ..... 47. **Glaucina.**
    Fore tibiæ flattened, with two claws at end ..... 70. **Acanthophora.**
11. Antennæ of ♀ bipectinate ..... 12.
    Antennæ of ♀ not bipectinate ..... 13.
12. Fore wings 11 veins ..... 40. **Pterotæa.**
    Fore wings 12 veins ..... 39. **Meris.**
13. Hind wings 6 and 7 stemmed ..... 16. **Nyctiphanta.**
    Hind wings 6 and 7 separate ..... 14.
14. Abdomen of ♂ with dorsal tuft on first and third segments.
    43. **Somatalophia.**
    Abdomen of ♂ without dorsal tuft on first and third segments ..... 15.
15. Thorax with anterior and posterior tufts ..... 36. **Spodolepis.**
    Thorax without anterior and posterior tufts ..... 16.
16. Fore wings of ♀ with fovea below at base ..... 17.
    Fore wings of ♀ without fovea below at base ..... 18.
17. Hind tibiæ of ♂ with hair pencil ..... 59. **Glena.**
    Hind tibiæ of ♂ without hair pencil ..... 8. **Physostegania.**
18. Clypeus roughened and pitted ..... 71. **Tracheops.**
    Clypeus smooth ..... 19.
19. Hind tibiæ of ♂ with hair pencil ..... 20.
    Hind tibiæ of ♂ without hair pencil ..... 24.
20. Palpi erect, recurved ..... 21.
    Palpi not erect, not recurved ..... 22.
21. Wings even, rounded ..... 75. **Stergamatæa.**
    Wings angulate, incised ..... 38. **Lytrosis.**
22. Wings deeply incised ..... 37. **Stenotrachelys.**
    Wings not deeply incised ..... 23.
23. Antennæ of ♂ with pectinations suddenly shortening to simple apex.
    55. **Cleora.**
    Antennæ of ♂ with pectinations gradually shortening to simple apex.
    33. **Aleis.**
24. Palpi long ..... 25.
    Palpi moderate ..... 26.
25. Hind wings with subcostal fovea below near base in ♂ .... 26. **Euemera.**
    Hind wings without subcostal fovea below near base in ♂ . 20. **Sympherta.**
26. Antennæ of ♂ bipectinate to apex ..... 32. **Nepytia.**
    Antennæ of ♂ with apex simple ..... 27.
27. Hind wings quite strongly angulate ..... 35. **Paraphia.**
    Hind wings not strongly angulate ..... 28.
28. Wings very broad; hind wings scalloped ..... 60. **Epimecis.**
    Wings moderate; hind wings even, or at most slightly wavy ..... 29.
29. Antennæ plumose; pectinations long ..... 53. **Selidosema.**
    Antennæ not plumose; pectinations moderate or short .... 15. **Dinstictis.**
30. Antennæ of ♂ with fascicles of hairs on each segment ..... 31.
    Antennæ of ♂ without fascicles of hairs on each segment ..... 32.

31. Hind tibiæ of ♂ with hair pencil.....57. **Aethaloptera.**
Hind tibiæ of ♂ without hair pencil.....59. **Ectropis.**
32. Hind tibiæ of ♂ with hair pencil.....33.
Hind tibiæ of ♂ without hair pencil.....13. **Philobia.**
33. Antennæ of ♂ dentate.....14. **Macaria.**
Antennæ of ♂ not dentate.....34.
34. Antennæ of ♂ flattened, naked.....35.
Antennæ of ♂ filiform ciliate.....12. **Sciagraphia.**
35. Thorax hairy.....30. **Enypia.**
Thorax scaly.....9. **Gueneria.**
36. Antennæ of ♂ bipectinate.....37.
Antennæ of ♂ not bipectinate.....89.
37. Wings of ♀ partly obsolete.....38.
Wings of ♀ developed.....39.
38. Segments of abdomen spined.....65. **Raphididemas.**
Segments of abdomen not spined.....64. **Apocheima.**
39. Antennæ of ♂ doubly bipectinate.....83. **Ripula.**
Antennæ of ♂ not doubly bipectinate.....40.
40. Hind wings of ♂ with subcostal fovea below at base.....41.
Hind wings of ♂ without subcostal fovea below at base.....44.
41. Palpi long, beak like.....25. **Catopyrrha.**
Palpi moderate or short.....42.
42. Abdomen of ♂ with lateral tuft.....42. **Spodoptera.**
Abdomen of ♂ without lateral tuft.....43.
43. Hind wings of ♂ with fold on inner margin above near base...41. **Ixala.**
Hind wings of ♂ without fold.....10. **Deilinia.**
44. Fore tibiæ clawed.....18. **Euaspilates.**
Fore tibiæ not clawed.....45.
45. Tongue absent, or very short.....46.
Tongue developed, at least one-half thorax.....54.
46. Palpi of ♂ very long, deltoid like.....68. **Encaterva.**
Palpi of ♂ not long, deltoid like.....47.
47. Antennæ of ♂ bipectinate to apex.....48.
Antennæ of ♂ with apex simple.....53.
48. Antennæ of ♀ bipectinate.....49.
Antennæ of ♀ not bipectinate.....51.
49. Thorax hairy.....50.
Thorax scaly.....69. **Philtræa.**
50. Abdomen densely hairy, and with dorsal tufts.....67. **Phæoura.**
Abdomen scaly, without dorsal tufts.....84. **Ennomos.**
51. Front and thorax hairy.....52.
Front and thorax scaly.....51. **Aethalodes.**
52. Tongue short.....72. **Dyscia.**
Tongue obsolete.....50. **Coniodes.**
53. Abdomen and femora densely hairy.....61. **Lycia.**
Abdomen and femora scaly.....52. **Chesiadodes.**
54. Antennæ of ♀ bipectinate.....55.
Antennæ of ♀ not bipectinate.....60.
55. All wings 6 and 7 stemmed.....29. **Platæa.**
Fore or hind wings 6 and 7 separate.....56.

56. Hind tibiæ of ♂ with hair pencil.....57.
Hind tibiæ of ♂ without hair pencil.....58.
57. Palpi long, beak like.....94. **Pherne.**
Palpi moderate or short.....78. **Neoterpes.**
58. All wings even, rounded.....45. **Exelis.**
Hind wings at least notched or angulate.....59.
59. Hind wings notched between 4 and 6; fore wings 10 and 11 stemmed at base.
85. **Xanthotype.**
Hind wings angulate; fore wings 10 and 11 separate at base.87. **Hyperitis.**
60. Abdomen of ♂ with tufts beneath.....56. **Melanolophia.**
Abdomen of ♂ without tufts beneath.....61.
61. Thorax with anterior longitudinal crest.....98. **Stenaspilates.**
Thorax without longitudinal crest.....62.
62. Fore wings with chitinous cross bar between submedian and 1*a*.
80. **Therina.**
Fore wings without such cross bar.....63.
63. Antennæ of ♂ bipectinate to apex.....64.
Antennæ of ♂ with apex simple.....66.
64. Fore wings with transparent lunule at end of discal cell.....91. **Selenia.**
Fore wings without transparent lunule at end of discal cell.....65.
65. Wings hairy; antennæ with pectinations filiform; palpi short.67. **Cingilia.**
Wings scaly; antennæ with pectinations clavate; palpi moderately long.
89. **Gonodontis.**
66. Hind wings 6 and 7 stemmed.....67.
Hind wings 6 and 7 separate.....68.
67. Thorax hairy.....79. **Sicya.**
Thorax scaly.....76. **Melanæa.**
68. Antennæ close together, the bases almost touching....74. **Sphærelodes.**
Antennæ normally separate.....69.
69. Femora and palpi densely hairy.....70.
Femora and palpi not densely hairy.....72.
70. Fore wings 11 veins.....1. **Epelis.**
Fore wings 12 veins.....71.
71. Antennæ of ♂ with pectinations filiform; front long haired.
4. **Dasyfidonia.**
Antennæ of ♂ with pectinations clavate; front not long haired.
97. **Snowia.**
72. Hind tibiæ of ♂ with hair pencil.....73.
Hind tibiæ of ♂ without hair pencil.....80.
73. Palpi long.....74.
Palpi moderate or short.....75.
74. Antennæ of ♂ pectinations filiform.....7. **Choraspilates.**
Antennæ of ♂ pectinations clavate.....6. **Mellilla.**
75. Wings even, rounded.....76.
Wings angulate.....78.
76. Antennæ of ♂ plumose; pectinations filiform.....2. **Enfidonia.**
Antennæ of ♂ not plumose; pectinations clavate.....77.
77. Front with overhanging scale tuft; fore wings 12 separate..31. **Philedia.**
Front without overhanging tuft; fore wings 12 anastomosing with 11.
27. **Caripeta.**

78. Larva with 12 legs.....81. **Metrocampa.**
Larva with 10 legs.....79.
79. Antennæ of ♂ with pectinations very short, each with a fascicle of hairs. 106. **Abbottana.**
Antennæ of ♂ with pectinations not very short and without fascicle of hairs. 90. **Euchlæna.**
80. Palpi long, beak like.....81.
Palpi moderate or short, at least not beak like.....82.
81. Wings strongly angulate.....92. **Epiplatymetra.**
Wings slightly, or not at all angulate.....73. **Lychnosea.**
82. All wings more or less rounded out above posterior angle...86. **Plagodis.**
All wings not so rounded out.....83.
83. Wings even, rounded or slightly wavy.....84.
Wings not even rounded; angulate, or strongly wavy.....88.
84. Fore wings 10 stemmed with 11 at base.....85.
Fore wings 10 separate from 11.....86.
85. Fore wings falcate.....101. **Syssaura.**
Fore wings not falcate.....102. **Caberodes.**
86. Antennæ with pectinations filiform.....87.
Antennæ with pectinations clavate.....54. **Mericisca.**
87. Palpi quite long, ascending; front tufted.....77. **Anagoga.**
Palpi short, porrect; front smooth.....23. **Aethyctera.**
88. Hind wings with wavy margins: fore wings 10 on 9; pectinations of antennæ clavate.....96. **Pryocycla.**
Hind wings angulate.....95. **Metanema.**
89. Wings of ♀ obsolete.....66. **Erannis.**
Wings of ♀ developed.....90.
90. Fore wings 1*b* rounded up near base.....11. **Episemasia.**
Fore wings 1*b* not rounded up near base.....91.
91. Hind legs of ♂ with tuft of hairs at end of femora..21. **Homochlodes.**
Hind legs of ♂ without tuft of hairs at end of femora.....92.
92. Thorax with dorsal longitudinal crest.....93.
Thorax without dorsal longitudinal crest.....94.
93. Antennæ of ♂ dentate.....99. **Marmarea.**
Antennæ of ♂ simple, flattened.....100. **Azelina.**
94. Hind tibiæ of ♂ with hair pencil.....95.
Hind tibiæ of ♂ without hair pencil.....102.
95. Fore wings 11 veins.....96.
Fore wings 12 veins.....97.
96. Wings even, spurs normal on hind tibiæ.....5. **Heliomata.**
Wings angulate; one upper spur on hind tibiæ much enlarged at end. 88. **Ania.**
97. Antennæ of ♂ dentate.....104. **Tetracis.**
Antennæ of ♂ not dentate.....98.
98. Antennæ of ♂ flattened.....99.
Antennæ of ♂ filiform.....103. **Oxydia.**
99. Thorax hairy.....100.
Thorax scaly.....101.

100. Wings angulate.....105. **Sabulodes.**
Wings even, rounded .....19. **Anthelia.**
101. Wings angulate.....82. **Eugonobapta.**
Wings even, rounded .....22. **Thallophaga.**
102. Palpi rather long.....103.
Palpi quite short.....104.
103. Wings angulate; antennæ of ♂ dentate.....93. **Synaxis.**
Wings rounded; antennæ of ♂ not dentate.....17. **Apolema.**
104. Thorax hairy.....28. **Phengommatæa.**
Thorax scaly .....105.
105. Antennæ of ♂ flattened .....24. **Aparcasia.**
Antennæ of ♂ filiform.....3. **Orthofidonia.**

### 1. **EPELIS** n. gen.

Type *truncataria* Wlk.

Palpi rather long, slender, porrect, loosely hairy; front with conical tuft; tongue developed; antennæ of ♂ bipectinate, apex simple, of ♀ filiform; thorax loosely scale hairy above and hairy below. Abdomen rather rough scaled; fore legs, femora strongly haired; hind tibiæ swollen in ♂, without hair pencil, with all spurs; fore wings 11 veins, 5 weak, scarcely tubular, 6 and 7 separate, 11 wanting, 10 from cell without fovea in ♂: hind wings veins all separate, 8 separate from cell; all wings even, rounded.

Distinguished by the 11 veined primaries, and the hairy scaled palpi, front, thorax and femora.

Species.—*E. truncataria* Wlk.
*E. faxonii* Minot.

### 2. **EUFIDONIA** Pack.

Geom. Moths, 225, 1876.

Type *notataria* Walk.

Palpi short, porrect, long scaled below; tongue strong; front smooth; antennæ bipectinate in ♂, apex simple, pectinations filiform; thorax and abdomen smooth; hind tibiæ swollen, with hair pencil in ♂, with all spurs present; fore wings even, rounded, 12 veins, 10 and 11 from cell, without fovea in ♂; hind wings even, rounded, 5 undeveloped, 8 separate from cell.

Species.—*E. notataria.*

### 3. **ORTHOFIDONIA** Pack.

Geom. Moths, 235, 1876.

Type *exornata* Wlk.

Palpi subascending, rounded, loose bushy scaled, moderate; tongue developed; front loose scaled; thorax and abdomen rather loosely

scaled; antennæ filiform, ciliate, the hairs rather long; hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings 12 veins, without fovea at base, 10 on 11 anastomosing with 12; hind wings veins all separate; all wings even, rounded.

Species.—*O. exornata* Wlk.
*O. semiclarata* Walk.
*O. vestaliata* Guen.

### 4. **DASYFIDONIA** Pack.

Geom. Moths, 233, 1876.

Type *avuncularia* Guen.

Palpi rather long, porrect, densely long hairy; antennæ of ♂ bipectinate, of ♀ filiform, the pectinations of ♂ filiform; front and thorax above and below densely long hairy; abdomen scaled, smooth; legs with femora densely hairy; hind tibiæ with two pairs of spurs in both sexes, without hair pencil in ♂; fore wings 12 veins, with fovea at base, 10 on 11, 11 from cell; hind wings veins all separate, 5 undeveloped, 8 separate from cell.

Species.—*D. avuncularia* Guen.

### 5. **HELIOMATA** Grt.

Proc. Ent. Soc. Phil. vi, 29, 1866.

Type *infulata* Grt.

Palpi short, porrect, rather heavily scaled below; front rough scaled, flat; antennæ of ♂ filiform, ciliate; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings even, rounded, 11 veins, 10 on cell, 11 wanting, without fovea in ♂; hind wings even, rounded, 8 separate from cell, 6 and 7 separate, 5 undeveloped.

Species.—*H. infulata* Grt.
*H. cycladata* Grt.
*H. elaborata* Grt.

### 6. **MELLILLA** Grt.

Buff. Bull. i, 12, 1873.

Type *chamæchrysaria* Grt.

*Gonilythria* Gump. Nov. Act. Halle, 49, 323, 18, type *chamæchrysaria* Grt.

Palpi long, heavy, subascending, end member very small, deflexed; front with conical tuft; antennæ bipectinate in ♂, pectinations claviform, segments comparatively few; thorax and abdomen smooth; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings

12 veins, without fovea below, 10 and 11 from one stem from cell; hind wings veins all separate, 8 separate from cell, 5 undeveloped; all wings even, rounded.

Peculiar in the fewness of the segments of the antennæ, these being not more than about one-half the usual number. The genus is structurally very close to *Chloraspilates* Pack., which it antedates.

Species.—*M. inextricata* Walk.
*M. chamæchrysaria* Grt.

### 7. CHORASPILATES Pack.

Geom. Moths, 211, 1876.

Type *bicoloraria* Pack.

Palpi moderately long, subascending, hairy, heavily scaled; tongue developed; front with a strong hair tuft; antennæ broadly pectinated almost to apex in ♂; thorax loosely scaled above, hairy or woolly below; abdomen smooth; legs smooth, hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings without fovea in ♂, 12 veins, 10 from 9, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Close to *Mellilla* Grt.; the antennæ of ♂, however, have the pectinations filiform, and the segments shorter and more numerous.

Species.—*C. bicoloraria* Pack.

### 8. PHYSOSTEGANIA Warr.

Nov. Zool. i. 406, 1894.

Type *pustularia* Guen.

Palpi rather long, porrect, rather heavily scaled; tongue developed; front scale tufted; antennæ of ♂ bipectinate, apex simple, of ♀ serrate; thorax and abdomen scaled, the latter slightly tufted at end; hind tibiæ somewhat swollen, without hair pencil in ♂, with all spurs; fore wings even, rounded, with very large fovea below in ♂ near base, a smaller one in ♀, 11 veins, probably sometimes 12; hind wings, 5 undeveloped, 6 and 7 separate, 8 separate from cell, the wings even, rounded.

Species.—*P. pustularia* Guen.

### 9. GUENERIA Pack.

Geom. Moths, 307, 1876.

Type *basiaria* Walk.

Palpi short, porrect; front smooth; antennæ of ♂ flattened, nearly naked; thorax and abdomen smooth, the latter somewhat tufted at end; hind tibiæ with all spurs in ♂, with hair pencil, and

with the tarsi much shortened; fore wings even, rounded, 12 veins, 10 from 9, 11 from cell, with large fovea at base; hind wings rounded, 6 and 7 separate, 8 separate from cell and without fovea at base, 5 undeveloped.

Differs from *Macaria* in the simple flattened antennæ, the antennæ being dentate in *Macaria*.

Species.—*G. basiaria* Walk.

### 10. **DEILINIA** Hüb.

Verz. 310. 1818 (*Sphecodes* Hüb. Tentamen).

Type *pusaria* Linn.

*Cabera* Treits, Schm. Eur. vi, 1, 343, 1827, type *pusaria* Linn.

Palpi short, porrect, rough scaled below; tongue developed; front smooth; antennæ of ♂ bipectinate, apex simple, of ♀ dentate; thorax and abdomen smooth; hind tibiæ of ♂ not swollen or slightly so, without hair pencil, with all spurs; fore wings 12 veins, without fovea below, 10 from 9; hind wings, 5 undeveloped, 8 separate from cell, in ♂ with fovea at base of vein 8.

Species:—

*D. borealis* Hulst, n. sp.
*D. elimata* Hulst.
*D. quadrifasciaria* Pack.
*D. variolaria* Guen.
*D. erythremaria* Guen.
*D. exanthemata* Scop.
*D. pacificaria* Pack.
*D. nevadaria* Hulst.
*D. fœminaria* Guen.
*D. falcataria* Pack.
*D. carnearia* Hulst.
*D. perpallidaria* Grt.
*D. quadraria* Grt.
*D. litaria* Hulst.
*D. liberaria* Walk.
*D. nigroseriata* Pack.
*D. behrensaria* Hulst.
*D. fumosa* Hulst, n. sp.

Dr. Butler tells us he has received the true *D. exanthemata* from Canada. *D. falcataria*, *D. carnearia* and *perpallidaria* are probably conspecific. The species of the genus differ in appearance, but agree in structure.

**D. borealis** n. sp.—Expands 25 mm. Palpi whitish at base, blackish at ends; front blackish gray; antennæ gray, ringed with black; thorax blackish gray. Abdomen whitish, thickly irrorated with black atoms. Wings light gray, thickly and evenly spattered with blackish scales to beyond cell, then somewhat darkened into an even, broad, indistinct line, followed by a lighter band of about the same width, then darker again to outer margin, the wings here being washed with fuscous, and all wings having a general dull gray appearance, darker at outer line and on outer spaces; beneath gray with black atoms, but not so much darkened as above, and of an even color over all the wings. In the ♀ the black

atoms within the outer space are not so dense, and the color is therefore of a much lighter gray, at the same time the darker margin is not so broad.

Male and female, Calgary, Canada, from Mr. Wolly-Dod.

**D. fumosa** n. sp.—Expands 35–40 mm. Antennæ long, plumose, dark fuscous; palpi fuscous brown; head fuscous; thorax and abdomen fuscous brown, the thorax darker and stained anteriorly with violet. Wings fuscous brown with a violet tint, the outer field in both wings considerably lighter than the rest, which is evenly colored; basal line black, not distinct on dark field, sharply and evenly rounded; a dark line across the wing at center of middle field, indistinct, somewhat rounded, extending across hind wing; outer line obsolete, its place showing by the contrast of the color of middle and outer fields; this edge distinct, sinuous, bending out at 5, bending out again between 3 and 4, between 1 and 2 turning in again to margin; an indistinct broken line in middle of outer field parallel with outer margin inwardly shown by blackish, outwardly by whitish scales; hind wings with edging continued, undulate; a black apical dash on fore wings with reddish brown tint about it; hind wings becoming reddish brown towards outer margin: discal spots on fore wings white; beneath quite even brownish with ocher tint, lines very faint or obsolete; discal spots on all wings black.

Colorado, Utah, California. Near to *Gnophos haydenata* Pack., and considerably like it in appearance. Faded specimens show the cross-lines more sharply, the outer field comparatively lighter and lose most, if not all, of the violet-brown tinge. The line in outer field shows across both wings in dark dots.

### 11. EPISEMASIA n. gen.

Type *cervinaria* Pack.

Palpi short, porrect; tongue developed; front smooth; antennæ flattened in ♂, filiform in ♀; thorax and abdomen smooth; legs smooth; hind tibiæ with two pairs of spurs, swollen and without hair pencil in ♂; fore wings 12 veins, 5 very weak, not tubular, 1*b* bent upward and rounded just beyond base, 6 and 7 widely separate, 10 on 8, 11 from cell; hind wings, 5 undeveloped, 8 separate from cell.

The special distinction is the curving of vein 1*b* of fore wings, which takes the form of being parallel with submedian, and then turning away from it an angle. It is caused by an incomplete fovea posterior to 1*b*.

Species.—*E. morbosa* Hulst, n. sp.
*E. cervinaria* Pack.

**E. morbosa** n. sp.—Expands 26 mm. Palpi ochreous; front ochreous, tinged with fuscous; thorax and abdomen ocher fuscous, the latter spotted with dark atoms towards end. Wings even, dull ocher, or pale buff, spotted quite evenly, but irregularly all over with small blackish blotches and blackish atoms;

discal spots black; margin with intervenular black dots; wings beneath quite as above, with a shade lighter color and less distinctness to the blackish spottings.

One ♂, Florida.

### 12. SCIAGRAPHIA n. gen.

Type *granitata* Guen.

Palpi moderate, porrect or subascending, generally strongly scaled, tongue strong; front rounded, rather broad, smooth or slightly tufted; antennæ of ♂ filiform or slightly flattened, ciliate or subfasciculate; thorax and abdomen smoothly scaled; hind tibiæ of ♂ swollen, with hair pencil, tarsi somewhat shortened; fore wings even, or slightly falcate, with fovea below in ♂, 12 veins, 10 on 9, 11 from cell, 5 weak; hind wings even, slightly wavy, rarely subangulate on outer margin, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

This genus differs from *Macara* Curt., *Philobia* Dup. and *Diastictis* Hub. in form of the antennæ, and from *Opisthograptis* Hüb. in the presence of the hair pencil on the hind tibiæ of the ♂.

Species:—

*S. sublacteolata* Hulst.
*S. colorata* Grt.
*S. maculifascia* Hulst, n. sp.
*S. granitata* Guen.
*S. denticulata* Grt.
*S. muscariata* Guen.
*S. punctolineata* Pack.
*S. heliothidata* Guen.
*S. californiata* Pack.
*S. respersata* Hulst.
*S. nubiculata* Pack.
*S. irrorata* Pack.
*S. neptata* Guen.
*S. hebitata* Hulst.
*S. sinuata* Pack.
*S. snoviata* Pack.
*S. pervolata* Hulst.
*S. meadii* Pack.
*S. continuata* Walk.
*S. mellistrigata* Grt.
*S. trifasciata* Pack.
*S. atrofasciata* Pack.
*S. subminiata* Pack.

A number of these species run very closely together, and some modification of specific standing may have to be made as more material is obtained for comparison.

**S. maculifascia** n. sp.—Expands 26-28 mm. Very close to *S. sublacteolata* Hulst, of which it is quite likely a variety. The markings are the same, the outer line of dots arranged in the same manner, but it differs very decidedly in the general color of the wings, the neatly pure white of *S. sublacteolata* being replaced by dark fuscous.

I have specimens of *S. sublacteolata* from Ohio and Texas which agree. All my specimens of *S. maculifascia* are from South Dacotah and also agree with one another.

### 13. **PHILOBIA** Dup.

Hist. Nat. vii, 195, 1829.

Type *notata* Linn.

Palpi moderate, subascending, end member horizontal; tongue developed; front with conical tuft of hairs; antennæ of ♂ dentate with fascicle of hairs on each segment; thorax and abdomen smooth; hind tibiæ of ♂ swollen, without hair pencil, with all spurs present; fore wings slightly angled on outer margin, 12 veins, 10 on 9, 11 from cell, with fovea below in ♂; hind wings strongly angled on outer margin, 8 separate from cell, 6 and 7 separate, 5 undeveloped.

I cannot separate some of our specimens from *notata* Linn. There are others from the southwest, to which the name *enotata* may apply, which seem to have the outer line of the fore wings less bent below costa and the antennæ of the ♂ more deeply serrate. They are also darker brown in color.

Species. – *P. notata* Linn.
*P. enotata* Linn.

### 14. **MACARIA** Curt.

Brit. Ent. iii, 132, 1826.

Type *liturata* Clerck.

Palpi moderate or short, porrect, rough scaled; tongue developed; front smooth, or with slight tuft; antennæ of ♂ serrate, ciliate, or subfasciculate; thorax scaled. Abdomen sometimes somewhat tufted at end; hind tibiæ of ♂ lengthened, swollen, with hair pencil, tarsi shortened; fore wings even, or slightly falcate, with fovea below in ♂, 12 veins or 11, the number being variable in the same species, vein 11 having a tendency to become obsolete; hind wings even, rounded, sometimes wavy, or even angulate on outer margin, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

*Aestimaria* Hüb., the type of *Pharmacis* Hüb. and *Gonodela* Bois. has slightly serrate antennæ in ♂, but lacks the hair pencil. *Opisthographis* Hüb. and *Rumia* Dup., of which *luteolata* Linn. is the type, have neither serrate antennæ nor hair pencil in ♂. *Psamatodes* Guen. is a synonym of *Macaria* if *eremiata* Guen. be the type.

It can, however, be referred to *catalaunaria* Guen. as type, which Guenée says has pectinated antennæ, but which species I have not myself examined.

Species:—

*M. infimata* Guen.
*M. s-signata* Pack.
*M. eremiata* Guen.
*M. hypœthrata* Grt.
*M. æquiferaria* Walk.
*M. dispuncta* Walk.
*M. minorata* Pack.
*M. grassata* Hulst.
*M. præatomata* Harv.
*M. similata* Hulst.
*M. mendicata* Hulst.
*M. septemfluaria* Grt.
*M. glomeraria* Grt.

### 15. DIASTICTIS Hüb.

Verz. 288, 1818.

Type *artesiaria* Fab.

*Itama* Hüb., Verz. 299, 1818, type *vincularia* Hüb.
*Rhyparia* Hüb., Verz. 305, 1818, type *melanaria* L.
*Dryocetis* Hüb., Verz. 316, 1818, type *roboraria* Schiff.
*Speranza* Curt., Brit. Ent. v, 222, 1825, type *brunneata* Thun.
*Grammatophora* Steph., Cat. 126, 1829, type *wavaria* L.
*Halia* Dup., Hist. Nat. vii, 537, 1829, type *wavaria* L.
*Siona* Dup., Hist. Nat. viii, 537, 1829, type *murinaria* Fab.
*Thamnonoma* Led., Zool. Bot. Ges. Wien, 232, 1853, type *vincularia* Hüb.
*Tephrina* Guen., Phal. ii, 96, 1857, type *vincularia* Hüb.
*Eufitchia* Pack., Geom. Moths, 247, 1876, type *ribearia* Fitch.
*Catastictis* Gump., Nov. Act. Halle 49, 329 and 370, 1887, type *ribearia* Fitch.

Palpi moderate or short; tongue developed; front smooth, or somewhat tufted; antennæ of ♂ bipectinate, apex simple, the pectinations gradually growing less towards simple apex, often clavate, generally moderate or short, not plumose, of ♀ serrate or filiform; thorax scaly, rarely somewhat tufted, somewhat hairy below. Abdomen scaled; hind tibiæ often swollen, but without hair pencil in ♂, with all spurs; fore wings even, 12 or 11 veins in the same species, with fovea below in ♂; hind wings rounded, even, or slightly wavy, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species:—

*D. ribearia* Fitch.
*D. sulphuraria* Pack.
*D. fascioferaria* Hulst.
*D. occiduaria* Pack.
*D. quadrifasciaria* Pack.
*D. flavicaria* Pack.
*D. gracilior* Butl.
*D. brunneata* Thun.
*D. crocearia* Hulst.
*D. ella* Hulst, n. sp.
*D. speciosa* Hulst, n. sp.
*D. vagaria* Walk.
*D. helena* Hulst, n. sp.
*D. inceptata* Walk.
*D. evagaria* Hulst.
*D. gausaparia* Grt.
*D. subcessaria* Walk.
*D. packardaria* Moesch.
*D. bitactata* Walk.
*D. wavaria* Linn.
*D. latiferrugata* Walk.
*D. graphidiaria* Hulst.
*D. octolineata* Hulst.
*D. decorata* Hulst, n. sp.

*D. rectifascia* Hulst, n. sp.
*D. guenearia* Pack.
*D. tenebrosata* Hulst.
*D. subalbaria* Hulst, n. sp.
*D. minuta* Hulst, n. sp.
*D. crassata* Hulst, n. sp.
*D. florida* Hulst, n. sp.
*D. festiva* Hulst.
*D. deceptata* Hulst, n. sp.
*D. pallidula* Hulst, n. sp.
*D. subacuta* Hulst, n. sp.
*D. cinereola* Hulst, n. sp.
*D. umbrifasciata* Hulst.
*D. inquinaria* Hulst.
*D. denticulodes* Hulst, n. sp.
*D. festa* Hulst, n. sp.
*D. subfalcata* Hulst, n. sp.
*D. bicolorata* Fab.
*D. distribuaria* Hüb.

**D. ella** n. sp.—Expands 32 mm. Palpi reddish ocher, yellowish at end; front ocher; thorax ocher reddish, stained anteriorly. Abdomen clay ocher; fore wings even, unbroken reddish orange; hind wings light ocher, washed with reddish orange outwardly, the color becoming strong towards and about anal angle; beneath yellow ocher, with a reddish orange tinge, less marked posteriorly on both wings. Legs concolorous.

Washington.

**D. denticulodes** n. sp.—Expands 32-36 mm. A species almost the exact counterpart of *Sciagraphia denticulata* Grt., in appearance, from some specimens of which I am not able to distinguish it by color or markings. It is, however, easily distinguished by the bipectinate antennæ of the ♂, and the sharply serrate antennæ of the ♀.

Male and female from Colorado.

**D. speciosa** n. sp.—Expands 37-38 mm. Palpi, front, thorax and abdomen rather dull ocher gray; fore wings gray, slightly ochreous, spotted with blackish scales, these being more frequent and giving a mottled appearance near the inner and beyond the outer lines: inner line not sharply defined, rather broad, wavy, dark fuscous; discal spot large, fuscous, oval, inclosing a spot of ground color; outer line not defined, broad, wavy, angulate, subparallel with outer margin; hind wings light ocher, striated outwardly with fuscous: beneath light ocher, the fore wings sometimes tinged with fuscous, and the discal spot and cross-lines faintly showing.

Hot Springs, New Mex., Mr. Meeske. I have the ♀ only, and the insect is probably not correctly placed here, as the thorax is much more woolly above and below than are the other species of the genus.

**D. helena** n. sp.—Expands 35 mm. Palpi yellow at base, smoky yellow outwardly; front smoky ocher: thorax smoky ochreous, washed with violet. Abdomen dull ocher. Wings rich reddish ocher, somewhat dotted and striated with brown; at the middle of the fore wings is a broad brown band, rather diffuse beginning one-fifth out from base on costa, evenly rounded outwardly to inner margin; ground color showing along costa and on outer margin of the band, the ground color making an entering broad angle about the subdiscal vein, almost severing the band; also an outward, submarginal, broad, brown band, straightly edged on inner side; hind wings with corresponding bands; beneath

the ground color less sharp, the bands almost obsolete, faintly showing from above and strongly marked only on inner edge near apex from costa to vein 6. Legs smoky yellow.

Brooklyn, N. Y. From Miss Helen Jackson, its discoverer, for whom it is named.

The type is a ♀, not in the best condition, and is so far as I know unique. It was taken on a window, being attracted to light in the thickly built up part of Brooklyn. I am suspicious that it may be an accidental importation from the Tropics. It has some resemblance to *D. abydata* Guen.

**D. decorata** n. sp.—Expands 35 mm. Palpi, front and antennæ dark ocher fuscous; thorax dark gray. Abdomen fuscous ocher, darker dorsally, becoming black on posterior part of each segment: fore wings bright, clear, very light gray, more or less overlaid with fuscous striations, the light color clearer on middle space and just beyond outer lines; basal line black, geminate, strong posteriorly; middle line black at costa, a shading across wing; outer line heavy, black, geminate, angled in opposite directions, and so more broadly separated below costa; marginal line black, broken; hind wings fuscous gray, two indistinct outer fuscous lines, more definite at inner margin; marginal line broken, black; all wings with lengthened black discal spots; hind wings slightly angulate at vein 4.

Platte Canon, Colorado, from Dr. Barnes.

**D. rectifascia** n. sp.—Expands 35 mm. Palpi and front fuscous gray; antennæ white, ringed with black; summit and thorax dull white, with a few blackish scales. Wings broad, dull white, slightly fuscous tinged, granular; outer line alone evident, fine dark fuscous, angled subcostally on fore wings, then straight across wing, parallel with margin, straight and faintly showing on hind wing; margins with faint intervenular black points; beneath as above, more glistening, lines wanting, discal spots of fore wings evident, black.

Washington, from Prof. Riley, taken by Mr. Koebele. The single specimen is a ♀.

**D. crassata** n. sp.—Expands 31 mm. Palpi ocher fuscous, front dark fuscous; thorax fuscous gray with a bluish tinge. Abdomen and all wings even light fuscous, rather evenly peppered with dark fuscous scales, slightly thicker on outer margin; outer line very faintly suggested; beneath same color, slightly more broken.

Colorado, from Prof. Gillette; one female only.

**D. subalbaria** n. sp.—Of the size and appearance of *Deilinia erythemaria* Guen. under which name it is probably in collections. The fore wings are not so rounded, have a more pointed apex, and are hardly so broad, but the resemblance is very decided. The wings are a dull white, with scattered dark specks, and the fore wings with an ochreous tinge on the anterior portion, especially towards base; along costa, especially basally, the dark atoms are thicker; below as above. The species is easily distinguished from *Deilinia erythremaria* by the antennæ of the ♂, as the pectinations are short and clavate: also the subcostal fovea at base of hind wings below is wanting.

Colorado.

**D. minuta** n. sp.—Expands 23–25 mm. Palpi and front fuscous ochreous to gray; summit generally gray, sometimes with ocher tint; thorax gray, or grayish fuscous. Abdomen fuscous, with an ocher tinge. Wings dirty fuscous gray, scales roughened, giving a sordid granular appearance, the fuscous shading more pronounced on the outer space, and the whole of the wings with irregularly scattered black scales; cross-lines three, indistinct or almost obsolete, to slightly darker fuscous across the wing, showing especially and distinctly in dark fuscous or black patches along costa; the first two are even, slightly rounded, the outer angulated outwardly at upper end of cell: the two outer are faintly continued on hind wings; discal spots annular, faint, diffuse; beneath clearer gray, with fuscous, or fuscous ocher blotches, becoming at times almost or quite solid, basally and on outer space; discal spots annular, more distinct than above, large.

Texas, Arizona. My specimens are all females.

**D. florida** n. sp.—Expands 26 mm. Palpi rather long, prominent, fuscous gray, with blackish intermixed; front strongly cone tufted, of the same color; thorax of same color, lighter gray posteriorly. Abdomen fuscous ocher; fore wings fuscous, with an ocher tinge to outer line, more blackish along costa; first two lines faint, the basal rounded, the second nearly straight, including the not prominent discal spot; outer line black, heavy, straight from costa near apex to the same distance within inner angle, edged outwardly with dull reddish brown; outer field fuscous, slightly ocher, margins black, wings subfalcate; hind wings fuscous gray, darker beyond line; the outer line present, blackish, quite distinct, bent anteriorly; marginal line blackish; beneath both wings fuscous ocher as fore wings above, the hind wings more brokenly; lines very faintly showing, outer space darker fuscous, discal points indistinct.

Florida.

**D. deceptata** n. sp.—Expands 31 mm. Palpi fuscous gray; front dark fuscous; thorax and abdomen fuscous gray, the latter somewhat ocher tinted; fore wings light gray, thickly overlaid with blackish scales, giving a broken dark gray color; basal space blackish at middle; basal line scarcely evident; middle line showing in broken darker patches; outer line in somewhat lengthened intervenular spots in a line parallel with margin, each spot preceded with a more or less distinct whitish spot; margin of intervenular black spots preceded by whitish; discal spots black, small; hind wings even fuscous, without cross-lines; discal spots obsolete; marginal line indistinct, dark fuscous; beneath dirty fuscous, slightly darker outwardly; discal spots of fore wings very faint.

New York, one female only.

**D. pallidula** n. sp.—Expands 25 mm. Light whitish ocher; fore wings crossed by three ocher lines, the first close to base, broad, rounded, angulate; the second just within middle of wing, broad, rounded, edges somewhat uneven; the outer with a fuscous tinge, narrow, running from costa to vein 6, following vein 6 outwardly at a sharp angle for a short distance, then turning sharply from it and continuing to inner margin parallel with outer edge, the line somewhat tremulous in its course; between veins 3 and 4 is a large broken black spot, divided by the outer line; hind wings, the three lines continued across the wings; discal spots dark, diffuse; beneath much as above, more fuscous, lines more in-

definite and less pronounced; fore wings much arched costally; hind wings wavy, produced, subangulate at vein 4.

Colorado.

**D. subacuta** n. sp.—Expands 26-28 mm. Palpi and front fuscous; thorax and abdomen fuscous ocher, the abdomen becoming dark fuscous dorsally after the first three segments; fore wings buff ocher, uniform, evenly scattered over with fuscous scales; cross-lines fuscous, nearly straight or slightly curved, parallel to each other, the middle one just within and touching the discal spot, the outer half way between the middle one and the outer margin; hind wings buff ocher lighter basally, with the two outer lines of fore wings continued; all discal spots present, black; all marginal lines broken, black; beneath color nearly as above, uniform, the outer line alone showing; discal spots distinct; marginal lines broken, black; fore wings slightly falcate in ♂; hind wings somewhat wavy in both sexes.

Colorado, Nevada.

**D. cinereola** n. sp.—Expands 30 mm. Palpi, front and thorax fuscous gray. Abdomen the same color, more fuscous towards end; fore wings light gray, with fine striations and powderings of fuscous gray, very even, clean and smooth in appearance, giving a gray, slightly bluish color; lines black, the basal faint, rounded, the outer not sharply defined, bent outward from costa, inward from beyond cell to vein 4, then nearly straight to inner margin, giving a gently evenly curved line, much as in *Macaria meadii*; hind wings even, light gray; all marginal lines black; beneath, fore wings colored much as above, with the cross-lines obsolete, the hind wings more heavily fuscous shaded and somewhat darker than the fore wings.

Colorado.

**D. festa** n. sp.—Expands 32 mm. Palpi, front and collar bright yellow ocher, slightly tinged with fuscous; thorax light gray, glaucous with a bluish shade. Abdomen light fuscous gray; fore wings subfalcate, light gray, bluish tinged, with scattered fuscous and blackish scales, more heavy outwardly, giving a general fuscous bluish gray color; lines three, faint, not easily discerned, fuscous in color; the first narrow, rounded; the second broader, more diffuse, rounded out from costa, nearly straight from middle of cell to inner margin; outer line evenly rounded out from costa and beyond cell at middle, parallel with outer margin, lightened up outwardly, and definitely marked with black points on each of the veins; all lines definite and blackish at costa; a brown subtriangular costal spot within apex, marginal line black, broken behind, solid and heavy below apex; hind wings nearly even fuscous gray, heavier and showing in outer cross-lines; discal spots dark; marginal line broken black, the wing itself with prominent angle at vein 4; beneath light gray, with more or less of scattered broken fuscous ocher, this showing quite definitely in outer bands on all wings.

One female, Colorado, taken June 6th.

**D. subfalcata** n. sp.—Expands 30-35 mm. Very much in appearance like *D. festa*, the body parts fuscous ocher, and the wings yellow ocher, more or less overlaid with fuscous, especially on outer third; the lines are heavier, more distinct and darker, the middle one more even below costa, the outer one more an-

gulate; the costal and outer shadings are heavier, the outer space sometimes being well darkened; the hind wings are slightly wavy margined, not angulate as in *D. festa;* beneath as *D. festa*, but ochreous, and with shadings much intensified.

Three females, Colorado. The specimens differ considerably, one having the outer margin much darker than the others, and one having the ground color a bluish gray, as in *D. festa*. I would regard them as varieties of *festa*, were it not for the marked difference in the shape of the hind wings.

### 16. NYCTIPHANTA n. gen.

Type *lætula* Hulst.

Palpi quite short, porrect, loosely scaled below; tongue weak, not more than one half thorax; front loosely hairy scaled; antennæ bipectinate to apex; thorax and abdomen smooth. Legs smooth, rather long; hind tibiæ not swollen, without hair pencil, and with two pairs of spurs in both sexes; fore wings 12 veins, with fovea at base in ♂, 6 at a point with 7, 10 and 11 from cell; hind wings, veins 3 and 4 separate, 6 and 7 stemmed, 5 undeveloped.

Distinguished by the stemming of 6 and 7 in the hind wings, a phase of structure very rare among the Ennominæ.

Species.—*N. lætula* Hulst, n. sp.

**N. lætula** n. sp.—Expands 40 mm. Palpi yellow ocher; front yellow; antennæ dark fuscous; thorax anteriorly bright yellow, ocher posteriorly. Abdomen ocher: fore wings bright yellow, the color more decided basally and along costa: a broad basal cross-line, faint purple; an outer cross-line, more distinct purple, parallel with outer margin; hind wings very even bright ocher color; beneath fore wings as above, more ocher in color, the basal cross-line wanting, the outer distinct purple; costa stained with broken fuscous: hind wings brighter yellow than above, except along anal margin, with a few scattered brown spots, and a broad uneven outer brown line; discal spots apparent, large, and decided on hind wings.

Arizona, one male.

### 17. APOLEMA n. gen.

Type *carata* Hulst.

Palpi rather long, slender, subascending; tongue developed; front probably scale tufted; antennæ of ♂ flattened, naked, segments close and even; thorax smooth. Legs smooth, hind tibiæ not swollen, without hair pencil, and with two pairs of spurs in both sexes; fore wings subangulate, falcate, rather narrow, with fovea at base in ♂, 12 veins, 6 separate, 10 and 11 from cell; hind wings slightly rounded in below anterior angle, then sinuate, 6 and 7 separate, 5 undeveloped, 8 separate from cell.

Close to *Opisthograptis* Hüb., differing especially in the naked flat antennæ of ♂.

Species.—*A. carata* Hulst.

### 18. EUASPILATES Pack.

Geom. Moths, 203. 1876.

Type *spinitaria* Pack.

Palpi short, hairy below; tongue developed; antennæ bipectinate in ♂, the pectinations moderate; front broad, smooth; thorax and abdomen rather smooth; thorax somewhat woolly below. Legs smooth, fore tibiæ short, stout, rather flattened, with two spurs at end, the outer strong, long, the inner smaller and shorter; hind tibiæ club shaped, with two pairs of spurs in both sexes; fore wings without fovea, 11 veins, 10 wanting, 11 from cell anastomosing with 9; hind wings 7 veins all separate, 5 undeveloped.

Species.—*E. spinitaria* Pack.

### 19. ANTHELIA n. gen.

Type *taylorata* Hulst.

Palpi long, subascending, heavy, end member deflexed; tongue developed; front with a long conical hair tuft; antennæ of ♂ filiform, scarcely flattened; thorax and abdomen smooth. Legs smooth, hind tibiæ of ♂ long, swollen, with hair pencil, two pairs of spurs in both sexes; fore wings subfalcate, even, without fovea at base in ♂, 12 veins, 10 from cell, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from the cell.

Species.—*A. taylorata* Hulst, n. sp.

**A. taylorata** n. sp.—Expands 35 mm. Palpi, front, thorax and abdomen smoky clay color, the prominent tuft of the front and the antennæ slightly less smoky than the rest; palpi quite prominent, the end member drooping; fore wings, apex sharp, slightly falcate, outer margin subangulate at vein 4; color dead clay, darker along costal field, and on outer field of hind wings, which correspond in color with the fore wings; both wings dotted with dark brown atoms; basal line of fore wings obsolete; outer line broad, brown, straight, with edges indistinct, fading into the ground color, beginning at costa three-fourths from base, and striking inner margin two-thirds from base; a corresponding submarginal broad line, more indistinct, starting from near apex, where it is very faint, then running parallel with outer margin; hind wings with a corresponding line three-fifths out from base, indistinct; discal spots wanting, or faintly suggested on fore wings; beneath an even clay color, considerably dotted with brown. Legs corresponding with thorax in color.

Victoria, British Columbia, from Prof. Taylor, to whom I dedicate the species.

20. **SYMPHERTA** n. gen.

Type *tripunctaria* Pack.

Palpi long, porrect or drooping, beak like, loose scaled below; tongue developed; front with a long conical hair tuft; antennæ bipectinate in ♂, the pectinations rather short, apex simple; thorax and abdomen rather loose scaled; legs smooth; hind tibiæ in ♂ swollen, without hair pencil in ♂, with two pairs of spurs in both sexes; fore wings falcate, rounded, with fovea at base of wing in ♂, 12 veins, 10 on 9, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species:—

*S. marcessaria* Pack. *S. julia* Hulst, n. sp.
*S. tripunctaria* Pack. *S. coloradensis* Hulst, n. sp.

**S. julia** n. sp.—Expands 28 33 mm. Palpi and front fuscous, to fuscous ocher; thorax gray to fuscous. Abdomen dull white to fuscous; fore wings light gray to fuscous, somewhat mixed with darker atoms; basal line dark brown to blackish, slightly rounded outward, not distinct; middle line a faint shade, straight, just within discal spot; outer line scarcely visible in black points on veins, or wholly obsolete, its place shown by a broad band nearly or quite obsolete costally; this varies in intensity and color, being sometimes reddish brown, reaching from that to olive color; a submarginal whitish dentate line, parallel with outer margin, runs through this band; this line often indistinct and having on the inner side a series of dark spots, especially marked at veins 3 and 4, and at 6 and 7; discal spots lengthened, enclosing a space of ground color, marginal line of distinct black points; hind wings gray to fuscous, darker outwardly, cross-line faint or obsolete; beneath fuscous to fuscous ocher, in all cases more ochreous on the veins.

Sudbury, Ontario, from Mr. Evans; Washington, from Prof. Riley; Calgary, from Mr. Wolly-Dod; Glenwood Springs, Col., from Dr. Barnes; Montana.

**S. coloradensis** n. sp.—Expands 35 mm. Palpi and front blackish gray or blackish; thorax dark fuscous gray. Abdomen dark gray, ringed with black; fore wings gray, stained with fuscous, and with a bluish tint, crossed by three subparallel broad lines dark fuscous in color, each somewhat bent at cell, the middle one enclosing the annulate discal spot; a submarginal lighter line parallel with margin or nearly so, edged inwardly below costa and at middle with dark brown cloudings; marginal line of faint black spots, edged outwardly with whitish; hind wings even dark fuscous, with a faint cross-line beyond cell; beneath fuscous, peppered with darker atoms, veins with ochreous tinting.

Colorado, from Mr. Bruce; somewhat resembling some specimens of *S. julia*, but with wings less broad, and pectinations of antennæ of ♂ much shorter.

### 21. **HOMOCHLODES** n. gen.

Type *fritillaria* Guen.

Palpi moderate, subascending, rather long, scaled below; tongue developed; front smooth; antennæ flattened, filiform, very finely ciliate; thorax and abdomen smooth; legs smooth, hind tibiæ in ♂ much swollen, with pencil of hairs, and with a short tuft of hairs at end of femora; two pairs of spurs in both sexes; fore wings rounded, without fovea at base in ♂, 12 veins, 10 from cell with 9, or short stemmed with it, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*H. fritillaria* Guen. (disconventa *Wlk.*)
*H. famulata* Hulst.

### 22. **THALLOPHAGA** n. gen.

Type *fautaria* Hulst.

Palpi long, subascending, end member small, deflexed; front with strong conical scale tuft; antennæ of ♂ flattened, somewhat lamellate; tongue developed; thorax and abdomen smooth; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings broad, slightly falcate, without fovea below, 12 veins, 10 and 11 from cell; hind wings 5 undeveloped, 8 separate from cell.

Species.—*T. fautaria* Hulst.

### 23. **AETHYCTERA** n. gen.

Type *electa* Hulst.

Palpi rather short, porrect, not heavily scaled; tongue strong; front broad, smooth; antennæ bipectinate in ♂, plumose, pectinations long, filiform, apex simple; thorax and abdomen scaled; hind tibiæ long, not swollen, without hair pencil, with all spurs; fore wings pointed, somewhat falcate, rounded, without fovea below, 12 veins, 10 on 9, 11 from cell; hind wings even, rounded, anal angle quite distinct, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*A. electa* Hulst, n. sp.

**A. electa** n. sp.—Expands 32 mm. Palpi ocher fuscous at end; front ocher yellow, with a fuscous stain; thorax ocher. Abdomen ocher at base, becoming ocher fuscous towards end, the whole intermixed with dark scales; fore wings even violet ocher, evenly peppered over with blackish scales; outer space slightly darkened, veins less violet; hind wings dull white, somewhat peppered along inner edge with darkish scales: beneath light violet ocher, much lighter than above, spattered with dark scales, not so distinct nor sharp in color as above, and these prevalent, especially on the hind wings; at apex of fore wings and along outer margin the color deepens so as to resemble the color above.

Siskiyou County, California.

### 24. **APÆCASIA** n. gen.

Type *detersata* Guen.

Palpi moderate, subascending, rather stout, long scaled below; front with scale tuft; tongue developed; antennæ of ♂ slightly flattened, filiform, finely and shortly ciliate; thorax and abdomen loose scaled; legs smooth, swollen, without hair pencil in ♂, with two pairs of spurs in both sexes; fore wings rounded, even, without fovea in ♂ at base, 12 veins, 10 and 11 from cell; hind wings, all veins separate, 5 undeveloped, 8 separate from cell.

Species:—

*A. detersata* Guen.
*A. defluata* Wlk.
*A. deductaria* Walk.
*A. extremaria* Wlk.
*A. bifilata* Hulst.

### 25. **CATOPYRRHA** Hüb.

Verz. 300, 1818.

Type *coloraria* Fab.

Palpi long, subascending, beak like, end member horizontal, the whole rather heavily scaled, front with strong conical tuft; tongue developed; antennæ strongly bipectinate in ♂, almost to apex; thorax anteriorly long hairy; abdomen rather loose scaled; thorax woolly hairy below; legs smooth, rather long, not swollen, without hair pencil, and with two pairs of spurs in both sexes; wings rounded, even; fore wings 12 veins, without fovea at base in ♂, 10 on 9, 11 from cell; hind wings with fovea beneath at base between vein 8 and cell; 5 undeveloped; 8 separate from cell.

Species.—*C. ferruginosaria* Pack.
*C. coloraria* Fab.

**C. coloraria** var. **perolivata** n. var.—Of the size and markings of the type form, but above of a beautiful olive-green, evenly spread over the whole surface of both wings; beneath a bright clear yellow on all wings from base to outer line, beyond that the yellow more or less overlaid with dark reddish and purple.

Texas, from Mr. Rautenberg. A most striking and beautiful insect, both above and below.

### 26. **EUEMERA** n. gen.

Type *juturnaria* Guen.

Palpi very long, beak like, heavily scaled on first and second members, subascending, end member sharp, horizontal; tongue developed; front with a conical hair tuft; antennæ bipectinate in ♂, apex simple; thorax and abdomen hairy scaled; legs long; hind

tibiæ in both sexes not swollen, without hair pencil, and with two pairs of spurs; wings even; fore wings with fovea at base in ♂, small, close to base, 12 veins, 10 on 9, 11 on cell; hind wings all veins separate, 8 separate from cell, a fovea not strongly developed at base of wing in ♂ between vein 8 and costa.

Species.—*A. juturnaria* Guen.
*A. viridirufaria* Neum.

### 27. **CARIPETA** Walk.

C. B. M. pt. 26, 1524, 1862.

Type *divisata* Wlk.

*Parennomos* Pack., Mass. Agric. Rep. 15, 1870, type *divisata* Walk.

Palpi moderate or rather short, porrect, slender; tongue developed; front smooth; antennæ bipectinate in ♂, apex simple, dentate in ♀; thorax rather rough haired, woolly below; abdomen smooth; legs smooth; hind tibiæ in ♂ swollen and with hair pencil, swollen in ♀, in both sexes with two pairs of spurs; wings even, rounded; fore wings without fovea at base in ♂, 3 and 4 from a point, 6 stemmed with 7, 10 and 11 from cell anastomosing with 12; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species:—

| | |
|---|---|
| *C. ida* Hulst, n. sp. | *C. angustiorata* Wlk. [*Grt.*) |
| *C. græfiaria* Hulst. | *C. aretaria* Wlk. (subochrearia |
| *C. divisata* Wlk. | *C. æqualiaria* Grt. |

**C. ida** n. sp.—Expands 35 mm. Palpi and front buff color, summit a little fuscous; thorax buff ochreous in front, light ocher mixed with white behind. Abdomen ochreous; fore wings somewhat orange ocher, lightening a little on the veins, unicolorous with the exception of a few scattered black scales to the discal spot, which is distinct black; an outer black line, uneven, rather jagged, parallel in its general direction with outer margin from costa to vein 6, then generally rounded inward and again outward, reaching inner margin at posterior angle of wing; a subapical dark space; otherwise the outer space unicolorous, the veins not lightened; hind wings ocher at base, gradually becoming orange ocher at outwardly; discal spots distinct, black, small; beneath unicolorous ocher, with an orange or fulvous tinge.

Colorado, Mr. Bruce. I have the ♀ only, and so cannot positively vouch for its generic reference.

### 28. **PHENGOMMATÆA** n. gen.

Type *edwardsata* Hulst.

Palpi moderate, porrect, or subascending, loosely scaled; tongue developed; front smooth; antennæ of ♂ flattened, lamellate, naked; thorax woolly above and below; abdomen woolly at base; legs,

femora with long hairs; hind tibiæ of ♂ swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings rounded or subangular at 4, without fovea at base in ♂, 12 veins, 6 separate, 10 and 11 stemmed, anastomosing with 12 and scarcely with 9; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*P. edwardsata* Hulst.
*P. gertruda* Hulst, n. sp.

**P. gertruda** n. sp.—Expands 40-42 mm. Palpi light ocher, stained with fuscous towards ends; front ocher fuscous; antennæ of same color, lighter basally; thorax ocher below, reddish brown above. Abdomen dull whitish; fore wings bright reddish brown, almost fulvous, marked with broad, white, longitudinal stripes on spaces between the veins; the anterior one between 7 and 8 is submarginal and short; the next reaches from margin almost to stem of 8 and 7; the next between 5 and 6 extends from margin, merging with the next lower, which itself is faint towards margin, the merging being on vein 5 outside of cell and extending longitudinally across cell, more faintly towards base, the lower part separating within cell and joining a corresponding band just below subdiscal vein; sometimes the ground color is apparent on vein 5 all its length, and the two white bands do not actually unite; the parts between 3 and 4 and 2 and 3 are short, not reaching cell; the bands between 1 and 2, and posterior to 1, are straight, the former joining with the one between 4 and 5 near base but not reaching it, the latter reaching to base; hind wings with lines broadened so that the fulvous color is mostly lost on basal two-thirds, and is fainter outwardly on veins; beneath as above, the fulvous more faint on fore wings, stronger on hind wings, especially anteriorly.

Colorado, from Mr. Cockerell and Mr. Bruce.

### 29. PLATÆA H.-Sch.

Auseur, Schmet. p. 84, 1855.

Type *californiaria* H.-Sch.

*Gorytodes*, Guen. Phal. ii, 179, 1857, type *californiaria* H.-Sch.

Palpi long, porrect, heavy; tongue developed; front with hair tuft; antennæ pectinated in both sexes, in ♂ almost to apex, pectinations moderate; thorax loosely scaled; abdomen smooth; legs smooth, hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings subfalcate, sometimes obscurely angulate at 4, especially in ♂, 12 veins, 6 and 7 stemmed, 10 and 11 from cell, without fovea below in ♂; hind wings 6 and 7 stemmed, 5 undeveloped, 8 separate from cell.

Dr. Packard figures the fore wings with 11 veins only. In many specimens I have found no such example and no such tendency.

Species.—*P. californiaria* H.-Sch. (uncanaria *Gn.*)
*P. trilinearia* Pack.
*P. diva* Hulst, n. sp.

**P. diva** n. sp.—Expands 35–38 mm. Palpi slender, porrect, rather long, gray, spattered with dark scales; front, thorax and abdomen gray, with like dark scales intermixed, these rather more dense on anterior part of thorax; fore wings gray, more or less powdered with blackish scales; a faint blackish basal line evident, deeply angled outwardly at middle and not reaching inner margin; middle field darkening outwardly, forming against the gray outer field a scalloped edge, the dentations being inward and on the veins, the posterior being the deeper, and the general trend of the line being away from outer margin; posteriorly the line stops at fold between veins 1 and 2, and, going towards base, joins the basal; outer field with a rather broad darkening along margin, and a black marginal line; fringe white, blackened outwardly at ends of veins; discal spot large, oval, black; hind wings even gray, translucent, slightly darker outwardly; marginal line blackish, fringe gray; discal spot dark, small, faint; beneath fore wings gray, darker basally, and with submarginal darker band; marginal line black, fringe as above; hind wings gray at base, darkening into a broad band on outer half; discal spots faint; legs and abdomen beneath dark gray.

California, from Dr. Riley, taken in Argus Mountains.

### 30. **ENYPIA** n. gen.

Type *venata* Grt.

Palpi moderate, porrect, rough scaled; tongue developed; front close scaled, rounded; antennæ of ♂ flattened, nearly naked, lamellate; thorax hairy above, woolly below, femora with fringe of hairs. Abdomen smooth; hind tibiæ scarcely swollen, with hair pencil in ♂, with all spurs; fore wings with fovea below in ♂, small, close to base, 12 veins, 10 stemmed with 11 at base; hind wings, 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings broad, even, rounded.

Species.—*E. venata* Grt.
*E. perangulata* Hulst, n. sp.

**E. perangulata** n. sp.—Expands 38–42 mm. In many respects like *E. venata* Grt., and probably its representative in Colorado. The ground color is much darker, being dark gray instead of whitish, and the space between the cross-lines evenly blackish gray. The lines run the same on the fore wings, and there is the same row of black points on the hind wings, though fainter and sometimes obsolete in *E. perangulata;* both fore and hind wings are narrower than in *E. venata*, and the insects has considerably the appearance of *Nepytia semiclusaria* Walk.

Colorado, from Mr. Bruce and Dr. Gillette.

### 31. **PHILEDIA** n. gen.

Type *punctomacularia* Hulst.

Palpi short, slender; tongue developed; front smooth; antennæ pectinated in ♂ to apex, pectinations rather short; summit of head with something of an overhanging scale tuft; thorax loosely scaled.

Abdomen smooth; legs smooth, hind tibiæ of ♂ swollen, with hair pencil in ♂, two pairs of spurs present in both sexes; fore wings even, without fovea below, 12 veined, 10 and 11 from cell, 12 separate; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*P. punctomacularia* Hulst.

### 32. NEPYTIA n. gen.

Type *semiclusaria* Walk.

Palpi moderate or small, not heavy; tongue developed; front broad, rounded, close scaled; antennæ of ♂ pectinated to apex, of ♀ filiform; thorax hairy scaled above, loose haired below. Abdomen smooth; legs slender, hind tibiæ slightly swollen, without hair pencil in ♂; fore wings with fovea below close to base in ♂, 12 veins, 10 and 11 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings even, rounded.

Species.—*N. nigrovenaria* Pack.
*N. semiclusaria* Walk.
*N. umbrosata* Pack.

### 23. ALCIS Curt.

Brit. Ent. iii, 303, 1825.

Type *repandata* Linn.

*Hesperumia* Pack., Proc. Bost. Soc. Nat. Hist. xvi, 37, 1874, type.

Palpi moderate, sometimes quite long, and sometimes quite short, porrect or subascending, rather rough scaled; tongue developed; front scaled, sometimes tufted; antennæ of ♂ bipectinate, apex simple, the pectinations generally clavate, sometimes filiform, moderate or short, always gradually shortening to simple apex, the antennæ never plumose, of ♀ filiform or serrate; thorax scaled or hairy scaled, rarely tufted posteriorly, somewhat hairy below. Abdomen scaled; hind tibiæ swollen, with hair pencil in ♂, with all spurs; fore wings 12 or 11 veins, varying in the same species, 11 being often or generally absent, with fovea below in ♂; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell, the wings rounded, rarely wavy or somewhat angulate.

*Alcis* and *Cleora* are very near each other, and while the various species included under them are very different in superficial appearance, I find it difficult to find any structural characteristic which will distinctly separate them. *Alcis* generally has shorter pectinations to the ♂ antennæ; they are generally clavate and always

gradually shorten to the simple apex. *Cleora* has long filiform pectinations to the ♂ antennæ, and they always shorten suddenly to the simple apex. The latter characteristic is peculiar to a few species mostly included under the old genus *Boarmia*.

Species:—

*A. sulphuraria* Pack.
*A. spododea* Hulst, n. sp.
*A. multilineata* Pack.
*A. dislocaria* Pack.
*A. metanemaria* Hulst.
*A. depromaria* Grt.
*A. dissonaria* Hulst, n. sp.
*A. dejecta* Hulst, n. sp.
*A. 5-linearia* Pack.
*A. obliquaria* Grt.
*A. atrolinearia* Hulst.
*A. imitata* Walk.
*A. californiaria* Pack.
*A. latifasciaria* Pack.
*A. haydenata* Pack.
*A. luridula* Hulst, n. sp.
*A. latipennis* Hulst, n. sp.

**A. dissonaria** n. sp.—Expands 35–38 mm. Of the *quinquelinearia* Pack. group. Color light gray or dull white, with a mixture of dark brown scales; lines of wings oblique, the basal obsolete towards costa, with an inner shadow line, the outer evenly sinuate with outer shadow line; the outer line obsolete towards apex, runs from that direction to middle of inner margin; a middle line faint, from costa, through discal spot, nearly reaching outer line then subparallel with it to inner margin; the lengthened discal spot and line with the sinus of the outer line give an impression of an inclosed rounded costal space; hind wings basal line indistinct; outer line with its outer shadow line wavy, most bent in at 3; marginal line fine, black, even; outer margin of fore wings evenly wavy, the hind wings more wavy, but with a strong inner depression at 5; thorax and abdomen light gray, segments of abdomen black anteriorly.

Colorado.

**A. spododea** n. sp.—Expands 32–34 mm. Palpi and front dark fuscous; antennæ fuscous, pectinations very short, though distinct; thorax fuscous, patagiæ blackish gray. Abdomen fuscous, the segments ringed with dark fuscous or black; fore wings dark gray, with four cross-lines, two basal close together, the inner the more diffuse, parallel, very slightly rounded outwardly; the third line is just within the discal spot, broad, black, nearly straight, more diffuse outwardly; the outer line is black, with a faint shadow line outwardly just beyond discal spot, nearly straight, or evenly curved twice; a submarginal jagged white line, edged with fuscous or blackish; marginal space darker than the rest of the wing; margin with black points; hind wings light gray at base, becoming dark gray outwardly; three faint lines showing, each limited by a black spot on inner margin; beneath light gray, the lines faintly shadowed.

Colorado. In appearance very much like *Sciagraphia atrifasciata*.

**A. dejecta** n. sp.—Expands 35–40 mm. An insect of the size of *Cleora larvaria*, and in its general appearance very much resembling it. The lines are in general very nearly the same, though much less decided in *dejecta*; the outer line of the fore wings is oblique, beginning nearer the apex, and the outer line of the hind wings is less angulate at middle; the whole appearance of the insect

is softer and more subdued; both the front and hind wings are more wavy on outer margin, and there is the difference in the antennal structure of the ♂.

Los Angeles, Cal., and Colorado.

**A. latipennis** n. sp.—Expands 45 mm. Palpi dull gray; front the same, blackish in middle, summit gray; thorax gray. Abdomen gray, washed posteriorly with fuscous. Wings light gray, overlaid thickly with fuscous scales, the veins with less of these, and therefore lighter; basal line indicated by three or four black points on veins; outer line indicated by black points on each vein parallel with margin and a faint connecting line; a line of intervenular black points on margin, and a submarginal light shade line; hind wings with straight inner shade, and a nearly straight median line emphasized in points on veins; a marginal black line; discal spots on all wings black; beneath more even, hardly lighter in color; discal spots very faint on fore wings, sharp and black on hind wings, no spots or lines otherwise; all wings are broad, the hind ones somewhat scalloped on outer margin.

"Easton, Washington." From Dr. Riley.

**A. luridula** n. sp.—Expands 43 mm. Palpi very short, blackish gray; front closely scaled, fuscous gray; antennæ, thorax and abdomen gray, with few darker scales; all wings of an even fuscous gray color, closely scaled, slightly powdered with darker scales, and the whole with a faint violet reflection; beneath as above, somewhat lighter and smoother. Legs concolorous, tarsi becoming darker.

Florida. From Mrs. Slosson.

### 34. AMILAPIS Guen.

Phal. ii, 62, 1857.

Type *unipunctata* Haw.

Palpi moderate or rather short, slender, porrect; tongue very short, not half thorax; front narrow, smooth; antennæ of ♂ bipectinate, apex simple, of ♀ serrate or simple; thorax hairy scaled above, hairy below; abdomen smooth, tufted at end in ♂; legs rather short, rough scaled, hind tibiæ of ♂ without hair pencil, with all spurs; fore wings with fovea below in ♂, 11 or 12 veins, bent or somewhat angulate on outer margin; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; outer margin wavy and quite decidedly projecting into rounded angles at veins 3 and 4.

Species.—*A. unipunctata* Haw.
*A. subatomaria* Guen.

### 35. PARAPHIA Guen.

Phal. i, 271, 1857.

Type *deplanaria* Guen.

Palpi moderate, slender, heavily scaled below; tongue strong; front scaled; antennæ of ♂ with short pectinations, each pectina-

tion with fascicle of hairs, apex simple; thorax and abdomen scaled, the latter tufted at end; hind tibiæ of ♂ with hair pencil, with all spurs; fore wings with fovea below in ♂, 12 or 11 veins, somewhat waved on outer margin; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; wing waved on outer margin forming rounded, projecting angles at veins 3 and 4.

Species.—*P. deplanaria* Guen.

36. **SPODOLEPIS** n. gen.

Type *substriataria* Hulst.

Palpi moderate, subascending, heavily scaled below; tongue developed; front very broad, rounded, smooth; antennæ of ♀ filiform; thorax with long scales, with an anterior, dorsal, dense, hair tuft, and the patagiæ running out into long stemmed scales forming raised tufts on each side; abdomen smooth; hind tibiæ of ♀ slightly swollen, with two pairs of spurs; fore wings decidedly arched at shoulder, subfalcate, angled at vein 5, 12 veins, 6 separate, 10 and 11 from cell, anastomosing with each other and with 9 and 12; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

I have the ♀ only. It is peculiar from the dorsal tufting and tufted patagiæ.

Species.—*S. substriataria* Hulst, n. sp.

**S. substriataria** n. sp.—Expands 48 mm. Palpi, front and thorax dark fuscous, the tufts of the latter white on end. Abdomen light fuscous, with a few scattered black scales: fore wings fuscous, showing a violet reflection in some lights across the middle field, with quite thickly scattered, raised, black and white scales; a basal black cross-line, edged within with raised white scales, with three inward angles and three outward loops, the largest on cell: an outer black line edged outwardly with white scales, oblique from costa to vein 6, following this some distance, then at an angle turning down to 4 not far from outer margin, then rounding back to 3, then with two more sinuses from 3 to 2 and 2 to inner margin; a blackish cloud on basal middle field on cell, and another below the cell, a marginal line of intervenular black dashes, parallel with the veins; hind wings light fuscous, black peppered, darker outwardly; beneath dull sordid fuscous, the fore wings faintly showing the lines, the hind wings with dark fuscous striations.

One ♀, Franconia, N. H., from Mrs. Slosson. The insect has somewhat the appearance of *Paraphia*.

37. **STENOTRACHELYS** Guen.

Phal. i, 290, 1857.

Type *approximaria* Hüb.

Palpi rather long, porrect, long and loosely scaled; tongue developed; front broad, bulging, loosely scaled; antennæ bipectinate

in ♂, pectinations long, not reaching to apex; thorax and abdomen loosely scaled; thorax below woolly; legs smooth; hind tibiæ long, somewhat swollen, without hair pencil, and with two pairs of spurs in both sexes; fore wings with fovea at base in ♂, 10 from cell, 11 on 12 and anastomosing more or less with 10; hind wings all veins separate; the fore wings vary from wavy to even margined; the hind wings are sinuate margined, often deeply so.

Species.—*S. approximaria* Hüb.
*S. permagnaria* Pack.

### 38. LYTROSIS n. gen.

Type *unitaria* H.-Sch.

Palpi rather long, erect, recurved; tongue developed; front smooth; antennæ of ♂ bipectinate almost to apex, pectinations long, plumose; thorax scale haired above, woolly below; abdomen smooth; hind tibiæ with two pairs of spurs in both sexes, with hair pencil in ♂; fore wings wavy margined, with a broad blunt angle at 4, with fovea at base in ♂, 12 veins, 10 separate, 11 on 12; hind wings unevenly wavy on outer margin, with fovea below at base in ♀, all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*L. unitaria* H.-Sch.

### 39. MERIS n. gen.

Type *alticola* Hulst.

Palpi quite short, slender, porrect; tongue developed; front broad, rounded, smooth; antennæ bipectinate in both sexes, in ♀ the pectinations short; thorax hairy scaled above, woolly below; abdomen smooth; hind tibiæ not swollen, with two pairs of spurs; fore wings very slightly angled at 4, 12 veins, 10 and 11 anastomosing with each other, and with 9 and 12; hind wings rounded, all veins separate, 5 undeveloped, 8 separate from cell.

I have the ♀ only. It separates by the presence in that sex of the bipectinate antennæ, and from *Pterotæa* may be known by the 12 veined fore wings.

Species.—*M. alticola* Hulst, n. sp.

**M. alticola** n. sp.—Expands 42 mm. Palpi fuscous, blackish at end. Head smoky; antennæ black above, light gray below and on pectinations; thorax fuscous gray, becoming light gray on patagiæ posteriorly. Abdomen gray, with faint blackish either side of dorsal line; fore wings light gray, thickly and quite evenly overlaid with dark fuscous scales giving a squamous appearance to surface; basal line not sharply defined, broad, slightly rounded outwardly; outer line faint, broad, illy defined, rounded at costa, then parallel with outer margin; discal spot indistinct, elongated, blackish; outer margin slightly angulated at 5; hind wings

light gray, scarcely with blackish scales basally, but these increasing towards outer margin; central cross-line very faint, most sharply defined by a black dot on inner margin: marginal lines blackish; discal spot faint; beneath as above, paler, markings faint.

Colorado, from Mr. Bruce. Female only.

### 40. PTEROTÆA n. gen.

Type *cariosa* Hulst.

Palpi moderate, porrect, rough scaled; tongue developed; front broad, rounded, scaled; antennæ bipectinate in both sexes, the pectinations in ♀ short; thorax rough scaled; abdomen smooth; hind tibiæ swollen; fore wings 11 veins, 11 wanting; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; fore wings even, hind wings triangular, waved on outer margin.

I have the ♀ only; the ♂ almost certainly has fovea below on fore wings, and probably has hair pencil on hind tibiæ.

Species.—*P. cariosa* Hulst, n. sp.

**P. cariosa** n. sp.—Expands 38 mm. Palpi, front and thorax blackish gray. Abdomen with each segment dark fuscous, becoming black posteriorly, the extreme posterior edge being light gray; fore wings gray, pretty generally overlaid with blackish, the gray showing more plainly on anterior middle field; basal line fine, blackish, not very pronounced, somewhat dentate, generally rounded, the veins basally more blackish; outer line fine, black, dentate, subparallel with margin; a fine, evenly scalloped, whitish line in submarginal space; margin scalloped and with a distinct, even, black marginal line, the black at the points extending out on the veins; hind wings color of fore wings, with the outer line of fore wings extended across; submarginal white line faint, broken; margin scalloped, edged with a distinct black line; beneath light fuscous, with dark fuscous pepperings, becoming entirely dark fuscous on apical portion of fore wings.

Soda Springs, Cal., August, from Dr. Behrens.

### 41. IXALA n. gen.

Type *desperaria* Hulst.

Palpi rather short, porrect, rough scaled below; tongue developed; front broad, rounded, short scaled; antennæ of ♂ bipectinate, apex simple, pectinations long, filiform; thorax smooth, somewhat hairy below; abdomen smooth, slightly tufted at end; legs long, slender, all spurs long and slender; hind tibiæ slender, without hair pencil, with all spurs; fore wings with fovea below in ♂, rather broad, even, rounded, 12 veins, 10 on 9, 11 from cell; hind wings with subcostal fovea below at base, and with fold beneath on inner margin with fringe of hairs within, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*I. desperaria* Hulst.

### 42. **SPODOPTERA** n. gen.

Type *opuscularia* Hulst.

Palpi moderate, rather heavy, porrect, loosely scaled; tongue developed; front broad, some rounded, with a short hair tuft below; antennæ bipectinated in ♂, apex simple, bases close together; summit with scale tuft; thorax loosely scaled; abdomen smooth, with large, lateral, broad, hair tuft from posterior part of third segment; thorax woolly hairy below; legs smooth, hind tibiæ scarcely swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings broad, even, rounded, triangular, without fovea at base in ♂, 12 veins, 10 on 9, 11 from cell; hind wings broad, rounded, with a fovea at base in ♂ at vein 8 below, and along inner margin beneath a broad, closely fitting fold, extending nearly the whole margin and nearly covering the cell, filled within with a mass of long yellowish woolly hairs; veins separate, 5 undeveloped, 8 separate from cell.

Species.—*P. opuscularia* Hulst.

### 43. **SOMATOLOPHIA** n. gen.

Type *umbripennis* Hulst.

Palpi moderate, ascending, rather stout, loosely scaled; tongue developed; front rounded, broad, loosely haired; antennæ bipectinate in ♂, pectinations long; summit with loose, overhanging scale tuft; thorax clothed with long hairs, long woolly beneath; abdomen coarsely haired and scaled with dense dorsal tuft of hairs on first and third segments; legs smooth, hind tibiæ in ♂ slightly swollen, without hair pencil, rather heavy, with two pairs of spurs, the upper distant from the end; fore wings even, a small faint fovea in ♂ at base, 12 veins, 1*b* very strongly furcate at base, 10 on 11, scarcely anastomosing with 9, 11 from cell; hind wings broad, even, all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*S. umbripennis* Hulst, n. sp.

**S. umbripennis** n. sp.—Expands 48 mm. Palpi, head, thorax and abdomen dull fuscous, the tuft on first segment of abdomen black; all wings dark fuscous, somewhat darker without basal line, within outer line, and in a row of clouded spots at middle of outer line; basal line faint, dentate and irregular; outer line two-thirds out, parallel with outer margin, evenly scalloped, between each vein, a slight whiteness within each dentation, the round of the scallops being outward; hind wings with a corresponding line and with a shading of a row of spots across middle of outer field.

Colorado.

### 44. TORNOS Morr.

Proc. Bost. Soc. Nat. Hist. xvii, 217. 1875.

Type *scolopacinarius* Guen.

Palpi rather long, heavy, porrect, loose scaled; tongue weak, rather short; front scaled, slightly tufted; antennæ bipectinate in ♂; thorax and abdomen stout, smooth; legs smooth, short, swollen, without hair pencil in ♂; with two pairs of spurs in both sexes; fore wings narrow, extended, even, with discal tuft of raised scales, without basal fovea in ♂, but with vein 1*b* strongly curved up basally, 11 veins, perhaps sometimes 12; when 11 are present 10 wanting, 11 from cell; hind wings 6 and 7 near together; outer margin rounded or sinuate, 5 undeveloped, 8 separate from cell.

Under *Lepiodes* Guenée described two species: *infectaria*, from S. Africa, and *scolopacinaria*. The two species are not congeneric; *infectaria* being more emphasized by being described first, and also figured, is rightly the type of Guenée's genus. I therefore apply Mr. Morrison's generic name to our species.

Species.—*T. scolopacinarius* Guen. (rubiginosus *Morr.*)
*T. abjectarius* Hulst.

### 45. EXELIS Guen.

Phal. i, 323, 1857.

Type *pyrolaria* Guen.

*Patridiva* Walk., C. B. M. Part 26. 1688, 1862, type *pyrolaria* Guen.

Palpi moderate, porrect or subascending, stout, loosely scaled; tongue weak, slender, short; front loose scaled, tufted; antennæ bipectinate in both sexes, apex simple, pectinations long and heavy in ♂, moderate in ♀; thorax and abdomen smooth; legs smooth, short, stout; hind tibiæ swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings without fovea at base in ♂, 11 veins, 10 wanting, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*E. pyrolaria* Guen. (approximaria *Pack.*)

### 46. SYNGLOCHIS n. gen.

Type *perumbraria* Hulst.

Palpi short, rather heavy, loosely scaled; tongue very short and weak; front tubercled, consisting of an external round ridge, hollowed within, rising at the center into a prominent truncated cone, reaching very much beyond the ridge; antennæ bipectinate in ♂, filiform in ♀; thorax and abdomen smooth; legs smooth, fore tibiæ

with a rather long slender claw or spine at end; hind tibiæ somewhat swollen, without hair pencil in ♂, with end spurs only; fore wings narrow, extended, without basal fovea in ♂, 11 veins, 10 wanting, 11 from cell, cell long; hind wings rounded, sinused in on outer margin before anal angle, all veins separate, 8 close to cell nearly its whole length, 5 undeveloped.

Species.—*S. perumbraria* Hulst, n. sp.

**S. perumbraria** n. sp.—Expands 18-25 mm. Palpi and front blackish; thorax dark fuscous. Abdomen blackish or fuscous; fore wings with the dark gray color of the *Tornos* group, consisting of dark fuscous scales laid upon a lighter base; cross-lines faint, blackish, the basal strongly bent out below cell, the outer sinused out beyond cell, and in at vein 2; marginal line black; hind wings somewhat lighter than fore wings, slightly hollowed out before inner angle; beneath slightly lighter than above, without lines.

S. California, from Hy. Edwards and Prof. Riley. Very much like some kindred species in appearance, and determined best by the generic structure.

### 47. GLAUCINA n. gen.

Type *escaria* Grt.

Palpi short, heavy, loose scaled; tongue developed, quite strong; front tubercled as in *Synglochis*, but the central cone much shorter, hardly exceeding outer rim; antennæ bipectinate in ♂, dentate in ♀; thorax and abdomen smooth; fore tibiæ with a fine slender spine at end; hind tibiæ with two pairs of spurs in both sexes, rather swollen, without hair pencil; fore wings narrow, extended, cell long, 11 veins, 10 wanting; hind wings sinused in before anal angle, extended, rounded, all veins separate, 8 close to cell nearly its whole length, 5 undeveloped.

Species.—*G. pygmeolaria* Grt.
*G. escaria* Grt.
*G. incopriaria* Hulst.

*Tornos candidarius* Hulst, Ent. Amer. ii, 192, is a Noctuid, the narrow wings, tubercled clypeus and spined fore tibiæ, leading to the error.

### 48. HOLOCHROA n. gen.

Type *dissociaria* Hulst.

Palpi moderate, rather heavy; tongue apparently obsolete; front broad, smooth; antennæ bipectinate in ♂, extreme apex simple; thorax above long loose scaled, below densely hairy; abdomen smooth; hind tibiæ with end pair of spurs only, not swollen, without

hair pencil; fore wings without basal fovea in ♂, 12 veins, 5 very weak, 10 on 11, scarcely anastomosing with 9, 11 from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*H. dissociaria* Hulst.

### 49. CŒNOCHARIS n. gen.

Type *interruptaria* Grt.

Palpi short, rather stout, loosely scaled; tongue well developed; front tubercled as in *Synglochis*, but the central portion evenly rounded or roughened and flat; antennæ bipectinate in ♂, dentate in ♀; thorax and abdomen smooth; fore tibiæ unarmed, hind tibiæ scarcely swollen, without hair pencil and with two pairs of spurs in both sexes; fore wings extended, 11 veins, 10 wanting, 11 from cell; hind wings extended, with a considerable sinus on outer margin just before anal angle, 6 and 7 short stemmed, 5 undveloped, 8 separate from cell.

Species:—

*C. eupitheciaria* Grt. *C. interruptaria* Grt.
*C. elongata* Hulst, n. sp. *C. ochrofuscaria* Grt.

**C. elongata** n. sp.—Expands 25 mm. Midway in size between *C. eupitheciaria* Grt. and *C. interruptaria* Grt., and of the same general color; lines on fore wings distinct, as in *C. interruptaria*, but widely separate, both scalloped between the veins, the outer one continued faintly on hind wings; discal spots distinct black.

Texas, Arizona.

### 50. CONIODES n. gen.

Type *plumigeraria* Hulst.

Palpi short, scarcely hairy; clypeus broad, flattened, somewhat long haired; antennæ of ♂ very lengthily and plumosely bipectinate to apex; tongue obsolete; thorax and abdomen slender, the thorax woolly hairy below, rather long loose hairy above, the abdomen not tufted; legs slender, femora glaucous, hind tibiæ with two pairs of spurs, without hair pencil; fore wings 12 veins, 3 and 4 separate, 6 short stemmed with 7, without fovea at base; hind wings 3 and 4 separate, 5 undeveloped, 6 and 7 separate, 8 separate, approximating cell to beyond middle.

The antennæ of the ♂ in this genus are more lengthily plumose than in any other American Geometer; vein 5 of the fore wings is also weak, amounting to scarcely more than a fold.

Species.—*P. plumigeraria* Hulst.

### 51. **AETHALODES** n. gen.

Type *packardaria* Hulst.

Palpi rather short, slender, smooth; tongue obsolete; front smooth; antennæ of ♂ bipectinate to apex, pectinations long, plumose; thorax and abdomen smooth; hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings broad, even, without fovea at base in ♂, 12 veins, 10 on 11, 11 from cell; hind wings broad, outer margin sinuate with dull angle at end of veins, all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*A. packardaria* Hulst.

### 52. **CHESIADODES** n. gen.

Type *morosata* Hulst.

Palpi very small, slender; tongue obsolete; front very protruding, rounded, close scaled; antennæ bipectinate in ♂ apex simple; thorax and abdomen smooth; hind tibiæ slender, without hair pencil, with two pairs of spurs in both sexes; fore wings even, rounded at both angles, without fovea at base in ♂, 11 veins, 10 wanting, 11 from cell; hind wings long, even, all veins separate, 5 undeveloped, 8 separate from cell.

Close to *Aethalodes* Hulst, differing in the strongly bulging clypeus and simple apex of antennæ.

Species.—*C. morosata* Hulst, n. sp.

**C. morosata** n. sp.—Expands 42 mm. Palpi and front blackish; thorax blackish gray. Abdomen blackish gray, becoming black posteriorly on each segment; fore wings blackish gray, with three slightly rounded blackish lines subparallel with outer margin, and with nearly the same distance between the basal and middle as between the middle and outer; the outer line a little emphasized on the veins; an even, submarginal whitish line beginning at a triangular apical whitish spot, and running slightly outwardly from margin; hind wings light grayish fuscous, darker along inner margin and outwardly with faint outer line; discal spots present, indistinct; beneath fore wings light gray, hind wings fuscous gray.

Sierra Nevada, Cal., from Henry Edwards.

### 53. **SELIDOSEMA** Hüb.

Verz. 299. 1818.

Type *ericetaria* Villa.

*Adactylotis* Hüb., Verz. 303. 1818, type *gesticulata* Hüb.

Palpi moderate or quite long, porrect, rough scaled; tongue developed; front scaled, sometimes somewhat tufted; antennæ of ♂ bipectinate, apex simple, the pectinations filiform, long, generally

suddenly shortening to simple apex, the antennæ generally plumose, of ♀ filiform or serrate; thorax scaled, sometimes tufted posteriorly, somewhat hairy below; abdomen scaled; hind tibiæ often swollen, with all spurs, without hair pencil in ♂; fore wings 12 or 11 veins, varying in the same species, even, with fovea below in ♂; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell, the wings rounded, even, or slightly wavy.

Species:—

*S. muricolor* Hulst, n. sp.
*S. correllatum* Hulst, n. sp.
*S. wrightiarium* Hulst.
*S. fuliginarium* Hulst.
*S. pulmonarium* Grt.
*S. humarium* Guen.
*S. umbrosarium* Guen.
*S. albescens* Hulst, n. sp.

**S. muricolor** n. sp. - Expands 34-36 mm.—Palpi, front and antennæ dark sordid fuscous; summit, thorax and abdomen light gray; all wings very smooth, even fuscous, or fuscous gray, without lines or spots; fore wings with costa and apical space, hind wings with outer space and inner margin slightly darker; margins with fine, intervenular, black dots; hind wings somewhat rounded out at vein 4; beneath almost exactly as above.

Hazleton, Pa., from Dr. Dietz. Very much in color like *Diastictis inceptata* Walk. (argillacearia *Pack.*), differing by the less rounded fore wings, the obtusely angled hind wings and the plumose antennæ.

**S. correllatum** n. sp.—Expands 28-30 mm. Palpi and front fuscous to dark fuscous; thorax fuscous gray to whitish fuscous. Abdomen whitish or grayish fuscous; fore wings white, or light bluish gray, somewhat scattered over with darker scales; basal line black, geminate, often indistinct, especially on cell; middle line indistinct, or a faint fuscous shading: outer line black, curved, geminate, more widely separate subcostally, with a reddish included shading on third quarter from costa. Wings slightly falcate: marginal line broken, black, heavier subapically; hind wings whitish or light gray, more fuscous along inner margin; all wings with distinct black discal spots; beneath light gray, heavily powdered with fuscous, discal spots distinct, diffuse, black.

Colorado, California, Oregon; the Oregon specimen taken August 24th.

**S. albescens** n. sp.—Expands 42 mm. Palpi blackish; front blackish, with a line of white along summit: rough, somewhat overhanging scales between antennæ, whitish on edge, blackish in middle; collar light gray, blackish behind; thorax whitish gray, with low posterior tufts. Abdomen whitish gray, with black speckles above, fuscous stained towards end. Wings even, clear whitish gray, with a few black scales; fore wings with black basal line, bent, rounded out most strongly on costal half; middle line at discal point, black and distinct at costa, showing in black spots across wing parallel with basal line; outer line black, running very much as in *larvaria;* a row of marginal black spots; hind

wings basal line lost; middle line showing only in a black spot on inner margin; outer line black, a little dentate outwardly on veins, slightly angled at 6; margin wavy; a black marginal line; discal spot oval, annulate, black, quite distinct; beneath even light fuscous on all wings.

Seattle, Wash., from Mr. Bolter. The insect has much the appearance of *Ectropis grisearia* Grt.

### 54. **MERICISCA** n. gen.

Type *gracea* Hulst.

Palpi short, porrect; front smooth; antennæ of ♂ bipectinate, apex simple, pectinations claviform; antennæ of ♀ filiform; thorax scaled, somewhat tufted posteriorly; abdomen smooth; hind tibiæ swollen, without hair pencil, with all spurs; wings broad, rounded, slightly wavy margined outwardly; fore wings without fovea below in ♂, 12 veins, 10 and 11 from cell; hind wings 5 not developed, 8 separate from cell.

Species.—*M. gracea* Hulst, n. sp.

**M. gracea** n. sp.—Expands 38–42 mm. Palpi short, light gray, with blackish intermixed, black at tips; front black on central perpendicular line, dark fuscous laterally, crown dark gray; thorax blackish dorsally at center, dark gray on patagiæ and around upper edges. Abdomen, first segment black in front, white behind, the rest dark fuscous, becoming blackish dorsally, more so on second and third segments; fore wings light gray, striated with black; basal line fine, black, angulated outwardly at cell and vein 1; outer line heavier, distinct, black, three-fifths out on costa straight to vein 5, then turning at a right angle inwardly nearly to cell, then at a little more than a right angle to between 2 and 3, then rounding to inner margin, reaching it a little within the middle; a blackish cloud or band across middle field, darkest within, forming towards and at inner margin a broad band with the outer cross-line; a black spot near costa within apex, and a broad, central, submarginal cloud reaching to outer line; on the basal field, central, is a cloud of reddish brown, and a broad band of the same color across the whole wing exterior to outer line; a row of marginal black spots; hind wings in general like the fore wings, lacking the basal line and reddish shade, but with outer line beyond middle distinct, rounding outwardly from anterior margin to vein 2, then turning to near middle of inner margin, a broad blackish central band less marked anteriorly, and an outer reddish brown band beyond cross-line, this also obsolete at anterior margin; marginal line black, distinct; outer edge of both wings somewhat scalloped, the hind ones more decidedly; beneath fuscous, smooth, the black parts above reflecting through.

Colorado, from Mr. Bruce.

### 55. **CLEORA** Curt.

Brit. Ent. ii, pl. 88, 1825.

Type *cinctaria* Schif.

*Boarmia* Treits. Schm. Eur. vi, 1, 187, 1827, type *cinctaria* Schiff.

Palpi moderate or quite long, porrect or subascending, rough scaled; tongue developed; front scaled, sometimes tufted; antennæ

of ♂ bipectinate, apex simple, the pectinations filiform, long, suddenly shortening to simple apex, the antennæ generally plumose, of ♀ filiform or serrate; thorax scaled, sometimes tufted posteriorly, somewhat hairy beneath; abdomen scaled; hind tibiæ swollen, with all spurs, with hair pencil in ♂; fore wings even, 12 or 11 veins, varying in the same species, with fovea below in ♂; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell, the wings rounded, even, or slightly wavy.

Species:—

*C. furfurata* Hulst.
*C. dataria* Grt.
*C. opacaria* Hulst.
*C. lixaria* Grt.
*C. cribraria* Guen.
*C. indicataria* Walk.
*C. pampinaria* Guen.
*C. formosata* Hulst, n. sp.
*C. vellivolata* Hulst.
*C. larvaria* Guen.

**C. formosata** n. sp.—Expands 35 mm. Close to *C. indicataria* Walk. (*polygrammaria* Pack.); the color is light gray, overlaid with fuscous lines, black, distinct; the outer is evenly and regularly bent twice, followed by a distinct brown band; the submarginal line is distinct white, the marginal line black, edged at base of fringe with white, hind wings with three dark shade lines, wavy, parallel with each other and the outer margin, all extra-discal; beneath light fuscous, evenly peppered with dark fuscous scales, lighter on the veins on fore wings.

Colorado, Mr. Bruce. A more than ordinarily showy insect of its class, the colors more vivid, and especially distinct by the brown cross band.

### 56. MELANOLOPHIA n. gen.

Type *canadaria* Guen. (*Tephrosia*).

Palpi short, stout, porrect, heavily scaled; tongue developed; front loose scaled, somewhat tufted below; antennæ bipectinate in ♂, apex simple, pectinations moderate; summit with slight scale tuft; thorax loosely scaled above, woolly haired below; abdomen coarsely scaled and haired with lateral tuft of hairs on third segment; legs smooth, hind tibiæ in ♂ swollen, with a dense pencil of fine hairs; two pairs of spurs in both sexes; fore wings even, without fovea at base in ♂, 12 or 11 veins, 10 and 11 stemmed from cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Dr. Packard figures *canadaria* with 11 veins in fore wings; this may happen, though I have seen no example. In that case 11 is wanting, having become coincident with 10.

Species.—*M. canadaria* Gn.

### 57. **AETHALOPTERA** n. gen.

Type *intextata* Walk.

Palpi moderate, porrect, rather slender; tongue developed; front smooth; antennæ of ♂ filiform, with two pairs of fascicles of hairs on each segment; thorax and abdomen smooth, the latter tufted at end; hind tibiæ of ♂ with hair pencil, swollen and with all spurs in both sexes; fore wings with fovea below at base in both sexes, 11 veins in all specimens examined, 11 wanting 10 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings broad, even, rounded.

Differs from *Ectropis*, especially in the hair pencil of the hind tibiæ of the ♂.

Species.—*C. intextata* Walk. (anticaria *Walk.*)

### 58. **GLENA** n. gen.

Type *cognataria* Hüb.

Palpi moderate, porrect, rough scaled; tongue developed; front smooth; antennæ of ♂ bipectinate, apex simple, of ♀ sharply serrate; thorax smooth above, slightly hairy below; abdomen smooth; hind tibiæ of ♂ swollen, with hair pencil; fore wings with fovea below in both sexes, that of ♂ being large and prominent, 11 veins in all specimens examined, 11 obsolete, 10 from cell, hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell.

To be recognized more especially by the fovea of the fore wings of the ♀, in which it agrees with *Aethaloptera*, but differs in the bipectinate antennæ of the ♂.

Species.—*G. cognataria* Hüb.
*G. minimaria* Guen. (texanaria *Hulst*).

### 59. **ECTROPIS** Hüb.

Verz. 316, 1818.

Type *crepuscularia* Bork.

*Tephrosia* Bois., Index Meth. 198, 1840, type *crepuscularia* Bork.

Palpi moderate, rather light, porrect; tongue developed; front quadrate, scaled; antennæ of ♂ filiform, with two pairs of fascicles of hairs on each segment; hind tibiæ somewhat swollen, without hair pencil, with all spurs; thorax and abdomen scaled; fore wings with fovea below in ♂, 12 or 11 veins; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings even, rounded, broad.

Species.—*E. crepuscularia* Schif.
*E. grisearia* Grt.

### 60. EPIMECIS Hüb.

Verz. 315, 1818.

Type *hortaria* Fab.

*Bronchelia* Guen., Phal. i, 287, 1857, type *hortaria* Fab.

Palpi rather short, stout, rough scaled; tongue strong; front scaled, slightly tufted; antennæ of ♂ bipectinate, apex simple, bristled, and slightly fascicled, of ♀ filiform with two long bristles at summit of each segment; thorax scaled, untufted, hairy below; abdomen scaled; hind tibiæ slightly swollen, without hair pencil in ♂, with all spurs; fore wings with fovea below in ♂, 12 veins, 10 and 11 from cell, separate from each other and 12; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell and running parallel with it much more shortly than usual, not more than one-third its length; all wings broad, rounded, the hind wings deeply scalloped.

Very close to *Selidosema*, and scarcely to be separated from it.

Species.—*E. hortaria* Fab. is probably *Geometra virginiaria* Cram.

### 61. LYCIA Hüb.

Verz. 319, 1818.

Type *hirtarius* Clerck.

*Amphidasis* Treit. Sch. Eur. vi. 1, 229, 1827, type *betularius* L.

Palpi moderate or short, long rough scaled; tongue obsolete, or very short; front densely haired, or long scaled; antennæ of ♂ bipectinate, apex simple; thorax densely haired above and below, with slight anterior and posterior tufts; abdomen densely hairy, without tuftings; femora, tibiæ, sometimes tarsi, long haired; hind tibiæ with upper spurs generally obsolete, rarely very small; fore wings without fovea at base in ♂; hind wings 5 undeveloped, 8 separate from cell.

Differs from *Biston* Leach, of which *stratiarius* Hufn. is type, and of which *Eubyja* Hüb. is a synonym in the simple apex of antennæ of ♂.

Species.—*L. ursaria* Pack.
*L. virginaria* Grt.
*L. cognataria* Guen.

### 62. PHÆOURA n. gen.

Type *mexicanaria* Grt.

Palpi moderate, slender, long haired; tongue obsolete; front densely long haired; antennæ of ♂ bipectinate to apex, of ♀ with short pectinations, apex simple; thorax densely long scaled above,

densely hairy below; abdomen rough scaled, with a tuft or pencil of hairs dorsally on each segment; legs somewhat long haired, hind tibiæ of ♂ not swollen, without hair pencil, with one pair of spurs in both sexes; fore wings without fovea below at base in ♂, generally 11 veins; hind wings 5 undeveloped, 8 separate from cell.

Differs from other allied genera especially in the bipectinate antennæ of ♀.

Species.—*P. mexicanaria* Grt.
*P. cristifera* Hulst, n. sp.

**P. cristifera** n. sp.—Expands 44 mm. Palpi dark fuscous, black at end; front smoky black; summit dark fuscous; thorax dark fuscous gray, blackish posteriorly. Abdomen dark fuscous, first two segments lined posteriorly with black, posterior segments with black much intermixed. Wings dark fuscous, these with thorax and abdomen washed with a soft violet-brown tint; lines after the *cognataria* pattern, on fore wings both heavy, distinct, black; basal beginning one-third out, evenly curving around to inner margin and reaching nearly to base; outer with broad, obtuse, prominent angle at vein 4, thus lower than in *cognataria*, which is at vein 5; hind wings outer line at middle, black, strong, distinct, even, very slightly wavy, without angle; inner line close by, subparallel, somewhat closer posteriorly, fainter; discal spot of fore wings an oval cloud, not distinct; beneath as above, with much less emphasis, the violet tint, however, stronger in certain shades. Legs blackish and fuscous.

Colorado, from Mr. Bruce.

### 63. NACOPHORA n. gen.

Type *quernaria* A. and S.

Palpi short, porrect, with long hairs; clypeus flattened, densely long haired; tongue absent, or very short; antennæ strongly bipectinate in ♂, apex simple; thorax and abdomen stout, heavy, thorax long woolly haired below, heavy haired above; abdomen slightly tufted dorsally on each segment; legs, with femora, woolly; hind tibiæ with one pair of spurs; fore wings 12 veined, 3 and 4 separate, 6 stemmed with 7, with fovea at base; hind wings 3 and 4 separate, 5 obsolete, 6 and 7 separate, 8 separate, approximating cell for one-half its length.

Species:—

*N. minima* Hulst, n. sp.
*N. carlotta* Hulst, n. sp.
*N. phigaliaria* Guen.
*N. quernaria* Ab. Sm.
*N. cupidaria* Grt.

**N. minima** n. sp.—Expands 32-33 mm. Palpi, front and thorax with black and light gray scales intermixed, giving a dark gray color; thorax with two posterior subdorsal tufts of long scales, these black at the end. Abdomen grayish

fuscous, the segments interlined with lighter fuscous, the segmental dorsal tufts distinct, prominent, black on end; fore wings light gray, finely spattered over with black, giving a uniform, granulated, blackish gray color, the veins a little darkened; a basal, black, distinct cross-line, straight, except with a clean cut angle outwards from submedian to 1*a*: an outer corresponding line, running from costa towards middle of outer margin till it reaches vein 5, then returning to cell at posterior angle, then with some waviness to inner margin; a marginal black line; discal spots indistinct, large; hind wings light gray at base, growing to blackish gray outwardly, with marginal black line and faint discal spots; beneath gray, the outer cross-line distinctly showing on all wings, even and rounded.

Colorado, from Mr. Bruce. I have females only, but they are in good condition.

**N. carlotta** n. sp.—Expands 42 mm. Thorax below, palpi, head and antennæ dull fuscous; the palpi black at end and front, blackish at middle; collar same color; thorax above dull fuscous, with a grayish tint. Abdomen fuscous gray, the segments with a shade of ocher brown anteriorly, each segment with a black spot on either side of dorsal line posteriorly, except on second segment, where the black reaches across the segment; fore wings fuscous, with blackish scales intermixed on basal field, light gray on middle field, blackish fuscous in a broad band beyond outer line, and gray submarginally; basal line black, indistinct near costa, beginning one-third out, rounded, some sinuate, rounding from subdiscal nearly to base on inner margin; outer line distinct, parallel with outer margin to 4, rounding inwardly to cell, then continuing its curve striking inner margin two-thirds out; a central broad stripe covering discal spot, straight from costa till it nearly meets the outer line, then subparallel and partly coalescing with it; hind wings light gray, a middle band faintly indicated, becoming evident at middle of inner margin; a distinct outer black line, sinuate across wing; discal spot black, distinct; outer field somewhat darker; beneath fuscous, the lines clearly evident, discal spot quite distinct.

Charlotte Harbor, Florida, from Mrs. Slosson.

### 64. APOCHEIMA Hüb.

Verz. 319. 1818.

Type *hispidaria* Fab.

*Ithusia* Hub., Verz. 319. 1818, type *zonaria* Schiff.

*Nyssia* Dup., Hist. Nat. vii, 283, 1829, type *zonaria* Schiff.

Palpi short, porrect, long haired; tongue obsolete; front densely long haired; antennæ of ♂ bipectinate, apex simple, of ♀ filiform; thorax densely long haired above and below, somewhat tufted; abdomen densely long hairy; legs long, haired on femora and tibiæ; hind tibiæ of ♂ not swollen, without hair pencil, in both sexes with one pair of spurs; fore wings without fovea below, 12 or 11 veins; hind wings 5 undeveloped, 6 and 7 separate or stemmed, 8 separate from cell; head retracted, small; female with wings rudimentary, or very little developed.

Species.—*A. rachelæ* Hulst, n. sp.

**A. rachelæ** n. sp.—Expands 33 mm. Palpi and thorax clothed with long woolly hairs, black at base, light gray towards end, giving these parts a gray appearance; this gray color is stronger on the patagiæ posteriorly, at the extremity of the abdomen, and on its sides; summit of head rust-brown, as is the thorax posteriorly at dorsum; also a rust-brown tuft dorsally on the first five segments of the abdomen; antennæ black. Wings semi-diaphanous, smoky gray, loosely and scantily covered with smoky gray scales and hairs; costa narrowly rust-brown half way out from base; veins lined with black, an extra black line showing on the fold of 1*a*; a somewhat faint, yet distinct basal cross line, and another beyond cell parallel with outer margin; the outer margin of the cell is darker, thus with the cross-line inclosing a triangular costal space; hind wings with a corresponding cross-line at middle; beneath much as above, but fainter.

This insect is very much in appearance like *A. lapponaria* Bois. of Europe. Mr. Bruce tells me that in England he used to take *A. zonaria* along salt marshes. *A. rachelæ* he found in grass about some salt springs in Colorado. It is a beautiful insect, the first of its group discovered in America, and I take pleasure in naming it after the wife of its discoverer.

### 65. RHAPHIDODEMAS n. gen.

Type *titea* Cram.

Palpi short, loosely scaled, not heavy; tongue developed, but not strong; front loosely haired; antennæ of ♂ bipectinate almost to apex, of ♀ filiform; thorax heavy scaled, tufted anteriorly and posteriorly, hairy below; abdomen hairy scaled, the segments above armed with many chitinous spines; hind tibiæ of ♂ swollen, without hair pencil, with all spurs; fore wings without fovea below in ♂, 11 veins; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell, ♀ wingless.

Peculiar in the spinous armature of the abdomen, much surpassing in this respect *Paleacrita* Riley and *Chondrosoma* Anker. *Phigalia*, a European genus, type *pedaria* Fab., shows the same tendency, but it is not so marked. *Phigalia* is also much more hairy in vestiture.

Species.—*R. nevadaria* Hulst, n. sp.
*R. olivacearia* Morr.
*R. titea* Cram.

**R. nevadaria** n. sp.—Expands 34-36 mm. Very near *R. titea* and *R. olivacearia*: about the size and wing shape of the latter, with the more distinct cross-lines of the former. The fore wings have more of blackish than *R. titea*, this being more emphasized in the outer shading of the outer line; all the veins outwardly are lined with black, especially strong beyond outer line; the middle and outer lines merge together at inner margin; the spinulations of the abdomen are not as strong as in the other species.

Nevada, Colorado.

### 66. ERANNIS Hüb.

Verz. 320, 1818.

Type *defoliaria* Clerck.

*Hybernia* Latr., Fam. Nat. 477, 1825, type *defoliaria* Clerck.

Palpi very short, almost rudimentary; tongue very short, almost obsolete; front scaled, broad; antennæ of ♂ with long fascicle of hairs from four slight protuberances on each segment; thorax hair scaled, somewhat tufted anteriorly, hairy below; abdomen scaled; hind tibiæ not swollen, without hair pencil, in both sexes with two pairs of spurs; fore wings without fovea below in ♂, 12 veins; hind wings 5 obsolete, 6 and 7 widely separate, 8 separate from cell; wings broad, rounded, even; ♀ with wings obsolete.

Under *Alsophila* I have spoken of the application of the generic term *Erannis*. It cannot be applied to the species ordinarily grouped under *Anisopteryx* Steph. as they belong to Hübner's genus *Alsophila*. The only proper application is to regard *defoliaria* as the type of *Erannis*, as this was beyond question the idea of Hübner. The species ordinarily grouped together in that genus I do not believe to be properly congeneric. Apart from other things there are great differences in the antennæ of the males, the majority having the antennæ bipectinate and so decidedly different from the antennæ of *E. defoliaria*. *Hybernia* Latr. if not regarded as a synonym of *Erannis*, must stand for the species with bipectinate antennæ in the ♂. But that group had already been called *Agrilopis* by Hubner. Our species are all of the *defoliaria* group.

Species.—*E. defoliaria* var. *vancouverensis* Hulst.
*E. tiliaria* Harr.
*E. coloradata* Hulst, n. sp.

*E. defoliaria* var. *vancouverensis* n. var. I give this varietal name to a form which seems to be common at Victoria, Vancouver Island, Canada. It is very uniform, and is much more sharply marked than the typical *defoliaria*, and the shadings of the ♂, and the general color of the ♀, are much darker. The typical form of *defoliaria* is not found as yet in our faunal limits so far as I am aware.

**E. coloradata** n. sp.—Expands 46 mm. Palpi fuscous brown, black at end; front fuscous brown; thorax and abdomen smoky ocher, the segments of abdomen darker anteriorly and dorsally; fore wings fuscous ocher, overlaid with dull brown; basal field dark, limited by a black line, which begins at costa one-quarter out, runs sharply outward, making sharp dentations at subcostal and base of vein 5, then forms a sinus inwardly with another sharp dentation near vein 1*a*;

the middle field is much lighter, being a sort of ocher brown; the outer line is black, distinct, beginning at costa two-thirds out, forming a dull angle on fold between 5 and 6, turning backward at vein 3 just outside the cell, then running parallel with outer margin to 1a, then forming a sinus outwardly to inner margin; outer field darker than middle field, lighter than basal, with a darker shading along costa near apex; discal spot distinct, black; hind wings translucent, light ocher, slightly striated with brown; beneath upper surface indistinctly reflected, paler, basal line obsolete, outer line quite distinct, outer field darkest.

Colorado, from Dr. Barnes.

Considerably like *E. tiliaria* in general appearance.

### 67. **CINGILIA** Walk.

Trans. Ent. Soc. Lond. third series, vol. i, 76, 1862.

Type *catenaria* Cram.

*Caterva* Grt., Can. Ent. viii, 205, 1876, type *catenaria* Cram.

*Vestigifera* Gump., Nov. Act. Halle, 49, 326, 369, 1887, type *catenaria* Cram.

Palpi moderate, slender, lightly scaled, porrect; tongue developed; front broad, round, clothed with hair; antennæ bipectinate to apex in ♂, dentate in ♀ pectinations, in ♂ filiform; thorax hairy above, woolly below; abdomen smooth, scaly; legs slender, hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings even, rounded, without fovea at base in ♂, 12 veins, 6 stemmed with 7, 10 and 11 from cell anastomosing with each other, and with 9 and 12; vestiture rather thin, hairy scaled.

Species.—*C. catenaria* Cram.

### 68. **EUCATERVA** Grt.

Pap. ii, 80, 1882.

Type *vararia* Grt.

Palpi of ♂ extraordinarily long, deltoid like, somewhat drooping second member much the largest, lightly clothed; of ♀ moderate, somewhat drooping; tongue obsolete; front broad, closely scaled; thorax and abdomen smooth; hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes, all spurs short and light; antennæ of ♂ bipectinate to apex, of ♀ filiform; fore wings even, rounded, without fovea in ♂, 12 veins, 6 separate, 10 and 11 from cell anastomosing with each other and with 9 and 12; hind wings cell long, 6 and 7 close or short stemmed, a fovea at base of 8 below in ♀, 5 undeveloped, 8 separate from cell.

Species.—*E. vararia* Grt.

### 69. **PHILTRÆA** n. gen.

Type *elegantaria* Hy. Edw.

Palpi very small, light, almost obsolete; tongue obsolete in ♂, very short in ♀; front flattened, hairy; antennæ bipectinate to

apex in ♀, pectinations long, bipectinated in ♀, apex simple, pectinations rather short; thorax and abdomen smooth; hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings even, without fovea at base in ♂, 6 separate, 10 and 11 from cell anastomosing with each other, with 9 and with 12; hind wings rounded, even, 6 and 7 stemmed, 5 undeveloped, 8 separate from cell.

Species.—*P. elegantaria* H. Edw.

### 70. **ACANTHOPHORA** n. gen.

Type *graefii* Hulst.

Palpi rather short, slender, lightly scaled; tongue developed; front broad, scaled; antennæ of ♀ bipectinate, apex simple; thorax and abdomen scaled, untufted; fore tibiæ short, broad and flat at end, with a claw on each side, the one on the inner side being the stronger; hind tibiæ of ♂ not swollen, without hair pencil, with all spurs; fore wings without fovea below in ♂, 11 veins, 10 absent, 11 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*A. graefii* Hulst, n. sp.

**A. graefii** n. sp.—Expands 32 mm. Palpi white, scales black at end; front white, with a black outward ring; antennæ fuscous: thorax white. Abdomen with some scattered black scales; fore wings white, some blackish along costa and a few small scattered black striæ, a little more close beyond disc, about 35 to 40 altogether; a marginal line of intervenular black points; hind wings white, with scarcely any black scales; marginal line of black points; beneath much as above, but with hind wings considerably black spotted.

Texas, from Mr. Graef.

### 71. **TRACHEOPS** n. gen.

Type *bolteri* Hulst.

Palpi very short, drooping; tongue developed; clypeus subquadrate, rather broader than long, swollen, the whole surface pitted and roughened; antennæ of ♂ bipectinate, segments short, pectinations short and thick, half as broad as length of segments, apex and base simple; thorax rough scaled, hairy below; abdomen smooth; hind tibiæ with all spurs; fore wings with fovea below, close to base and small, 12 veins, 6 widely separate from 7, 10 and 11 short stemmed with each other, 10 anastomosing with 9 and 11 with 12; hind wings 3 and 4 separate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Distinguished more especially by the roughened pitted clypeus and the somewhat peculiar ♂ antennæ.

Species.—*T. bolteri* Hulst, n. sp.

**T. bolteri** n. sp.—Expands 32 mm. Palpi fuscous; front fuscous clay color; thorax fuscous clay anteriorly, becoming light fuscous gray posteriorly, with a lunule of black at middle of each patagia, and a black dorsal spot posteriorly on thorax. Abdomen dull whitish, with black spots dorsally on each segment; fore wing whitish, with an olive tint basally, somewhat mixed with fuscous scales and with much of black in lines and shadings, these giving the wing an irregularly whitish and black appearance; first there is a black costal spot at extreme base, then a blackish clouding darkest at costa on basal field; basal line black, curved and angled, the largest angle being on submedian space inwardly; a somewhat indefinite middle intra-discal black line, zigzag, with two angles on each side, followed outwardly with blackish cloudings; discal spot black, distinct; outer line bent, rounded, black, with long teeth running on outer side out on veins; submarginal blackish cloudings and a row of black intervenular spots; hind wings white, with black discal spots and loose blackish cloudings outwardly, these being parts of somewhat indeterminate cross-lines; beneath almost as above, but with ground color more fuscous and less clear; antennæ of ♂ black. Legs light fuscous, spotted with black on coxæ and femora, becoming solid black anteriorly on tibia and tarsi. The single ♂ specimen gives the impression that in newly-emerged specimens the fore wings have a decided olive or greenish shading.

Las Vegas, New Mex., from Mr. Bolter, to whom I dedicate the species.

### 72. **DYSCIA** Hüb.

Verz. 314, 1818.

Type *conspersaria* Fab.

*Psednothrix* Hüb., Verz. 319, 1818, type *belgaria* Hüb.
*Mœsia* Steph., Ills. 3, 150, 1829, type *belgaria* Hüb.
*Scodiona* Bois., Index Meth. 185, 1840, type *conspersaria* Fab.
*Napuca* Walk., C. B. M. Geom. 1693, 1862, type *orciferata* Walk.

Palpi moderate or short, slender, subascending or porrect; tongue very short or wanting; front hairy, broad, not tufted; antennæ of ♂ bipectinate to apex; thorax hairy, scaled above, hairy below, without tufts; abdomen scaled, somewhat tufted at end; hind tibiæ slightly or not at all swollen, with all spurs, without hair pencil in ♂; fore wings without fovea at base below, 12 veins, 10 and 11 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings even, rounded, the fore wings with a tendency to hairiness of vestiture.

Mr. Meyrick joins this genus with *Crocota* Hüb., whose type is *lutearia* Fab., but it is definitely separate by the undeveloped tongue. There is some difference in the length of the palpi, but it is neither marked nor definite; Guenée puts *gilvaria* Fab. and its allies under

*Aspilates* Treits., and so with his determination *Aspilates* would be a synonym of this genus. But Treitschke did not have that idea of his genus. He had under it discordant material, but none of the earlier named species apply here. The first is *purpuraria* Linn., and this may be taken as the type of *Aspilates*. This is ordinarily catalogued as *Lythria*, but as Mr. Meyrick remarks, *Lythria* is a synonym of *Botys* Latr. afterwards applied, but without right, to a genus of the Pyralidæ.

Mr. Warren, Nov. Zool. vol. i, 437, 1894, calls attention to the fact that *mundataria* Cr. has bipectinate antennæ in ♀, thus separating it from this genus, and calls it *Megaspilates*. But *mundataria* Cr. is type of *Conchia* Hub. Verz. 337, 1818, which, of course, has priority.

Species. – *D. orciferata* Walk.

### 73. LYCHNOSEA Grt.

Trans. Kans. Acad. Sci. viii, 52, 1883.

Type *helviolaria* Hulst.

Palpi long, porrect, heavily scaled; tongue developed; front hair tufted; antennæ of ♂ bipectinate, apex simple; thorax hairy scaled; abdomen slender, smooth; legs long, slender; hind tibiæ long, not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings even, rounded, without fovea at base in ♂, 12 veins, 10 on 9, 11 from cell, 6 and 7 stemmed; hind wings 6 and 7 stemmed, 5 undeveloped, 8 separate from cell.

Species.—*L. helviolaria* Hulst.
*L. intermicata* Walk.

### 74. SPHÆCELODES Guen.

Phal. ii, 116, 1857.

Type *vulneraria* Hüb.

*Brotis* Hüb., Verz. 303, 1818, type *vulneraria* Hüb.

Palpi stout, porrect or subascending, heavily clothed; tongue developed; front hair tufted; antennæ bipectinate in ♂, pectinations moderate, the bases of the antennæ very close together, almost touching; thorax densely haired above and below; abdomen smooth; hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings 12 veins, 10 on 9, 11 from cell; hind wings all veins separate, 8 close to cell one-half its length then diverging at a sharp angle.

*Brotis* Hüb. is preoccupied by Hübner himself, he having given the name previously to another genus of Lepidoptera. The genus is a very peculiar one in the position of the antennæ; the single species has a decided resemblance to the genus *Eudamus* of the Rhopalocera, and is probably a day flyer.

### 75. **STERGAMATÆA** n. gen.

Type *inornata* Hulst.

Palpi moderately long, recurved, reaching well towards summit of head; tongue strong; antennæ of ♀ filiform; front rounded; thorax hairy scaled, hairy below; abdomen scaled; hind tibiæ with all spurs; wings rather broad, even, rounded; fore wings 12 veins, 10 and 11 stemmed from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell.

I have the ♀ only. Its peculiarity, the recurved palpi, is a rare form of structure in the family.

Species.—*S. inornata* Hulst, n. sp.

**S. inornata** n. sp.—Expands 48 mm. Palpi dark fuscous; front, thorax and abdomen whitish ocher stained with fuscous; all wings of the same color, varying only enough to give faint suggestion of lighter cross-bands basally and outwardly, the limitations of these being scalloped and slightly darker; discal spots fine, black; beneath slightly less ocher, and a broad outer fuscous band parallel with outer margins on all wings.

Female only, Colorado, from Mr. Bruce.

### 76. **MELEMÆA** n. gen.

Type *magdalena* Hulst.

Palpi moderate, subascending, rather slender, lightly scaled; tongue developed; front rounded, conical, short scaled; antennæ of ♂ bipectinate, apex simple; thorax and abdomen smooth; hind tibiæ of ♂ not swollen, without hair pencil, with all spurs; fore wings without fovea below, 12 veins, 10 from a point with 6 and 9 at end of cell, 11 from cell; hind wings rounded, 5 undeveloped, 6 and 7 stemmed, 8 separate from cell.

Species.—*M. magdalena* Hulst, n. sp.
*M. morsicaria* Hulst.

**M. magdalena** n. sp.—Expands 35 mm. Palpi ocher yellow, reddish on outside; front reddish yellow; antennæ yellow fuscous, end of pectinations much darker; thorax yellowish, as is also the abdomen, but the latter has a reddish tinge dorsally; fore wings reddish orange, lighter along costa, becoming straw-yellow towards apex; from costa just within apex this yellow reaches in a rounded loop, broader at middle, to base at inner margin; beyond this following

the same course the red is mixed with yellow, followed again with a strip of yellow reaching from near apex to vein 3; within the first yellow band, and without the second one, are single lines, deep red, with dark scales intermixed, following the same general course, the inner straighter, the outer with deeper loop, the outer beginning at the deep red apex, and both continuing to base; the inner inwardly, and the outer outwardly, are shaded with violet pinkish; hind wings reddish yellow, lighter towards base, more yellowish anteriorly, more reddish about anal angle; a deeper reddish line starting within anterior angle, rounding close to outer margin, then turning inwardly to middle of anal margin; beneath as above, but fainter, but with apex of fore wings bright orange-red.

From Mr. Bruce, Colorado.

A most beautiful insect. Different in its style of ornamentation from any other American Geometer that I know.

### 77. **ANAGOGA** Hüb.

Verz. 294, 1818.

Type *pulverata* L.

*Azinophora* Steph., Cat. 126, 1829, type *pulverata* L.
*Numeria* Dup., Lep. Fr. viii, 107, 1829, type *pulverata* L.

Palpi moderately long, ascending, heavily scaled, end member very small; front tufted; tongue developed; antennæ of ♂ bipectinate to apex, pectinations filiform, of ♀ deeply serrate, almost pectinated; thorax hairy above, woolly below; abdomen loosely scaled, untufted; wings broad, even, rounded; fore wings without fovea below, 12 veins, 6 separate, 10 and 11 from cell separate from each other as well as from 12 and 9; hind wings 5 undeveloped, 8 separate from cell; hind tibiæ not swollen, with all spurs, without hair pencil in ♂.

Species.—*A. occiduaria* Walk.

### 78. **NEOTERPES** n. gen.

Type *ephelidaria* Hulst.

Palpi ascending, rather long; tongue strong; front close scaled, slightly tufted; antennæ bipectinate in both sexes, in ♂ almost to apex; thorax hairy scaled above, slightly hairy below; abdomen scaled, untufted; hind tibiæ of ♂ swollen, with hair pencil, with all spurs present; fore wings slightly angulate on outer margin, without fovea below, 12 veins, 10 and 11 from cell; hind wings round, or scarcely angled, 5 undeveloped, 6 and 7 stemmed, 8 separate from cell.

This may be the same as *Sicyodes* Warr., but the description, "like *Sicya* Guen., but with the ♀ antennæ pectinated, though more

shortly than in the ♂," is indefinite. If *Sicyodes* be like *Sicya* otherwise, then *Neoterpes* differs generically, as it has a hair pencil on hind tibiæ in ♂.

Species.—*N. ephelidaria* Hulst.
*N. snoviaria* Hulst.
*N. edwardsata* Pack.

### 79. SICYA Guen.

Phal. i, 104. 1857.

Type *macularia* Harr.

Palpi moderate, ascending, rather heavy, heavily scaled below; tongue developed; front tufted; antennæ bipectinate in ♂, apex simple, filiform in ♀; thorax long haired above, woolly below; abdomen smooth; hind legs not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings without fovea at base in ♂, angled at 4 in ♂, less so or not at all in ♀, 12 veins, 6 at a point or short stemmed with 7, 10 and 11 from cell; hind wings 6 and 7 stemmed, 8 separate from cell, 5 undeveloped.

Species.—*S. macularia* Harr.

### 80. THERINA Hüb.

Verz. 283, 1818.

Type *prosaparia* Linn.

*Ellopia* Treits., Schm. Eur. vi, 89, 1827. type *prosaparia* Linn.

Palpi short, light, porrect, thinly scaled; tongue developed; front scaled; antennæ of ♂ bipectinate to apex, of ♀ slightly serrate; thorax and abdomen scaled, thorax slightly hairy below; abdomen somewhat tufted at end; hind tibiæ generally swollen, without hair pencil, with all spurs; wings broad, rounded, even, or slightly angulate, vestiture thin, rather hairy; fore wings with chitinous cross-bar between submedian and vein 1*a* near base, probably the outer relic of a fovea, which is even now suggested in both sexes, 12 veins, 10 and 11 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species:—

*T. vitraria* Grt.
*T. cavillaria* Hulst.
*T. pellucidaria* G. and R.
*T. endropiaria* G. and R.
*T. athasiaria* Walk.
*T. fiscellaria* Guen.
*T. fervidaria* Hüb.

### 81. METROCAMPA Latr.

Consid. gen. 366, 1810.

Type *margaritata* Linn.

Palpi slight, subascending, not long; tongue developed; front closely scaled; antennæ of ♂ bipectinate almost to apex, the extreme apex simple, of ♀ serrate; thorax hairy scaled above, somewhat woolly below; abdomen scaled, somewhat tufted at end; fore wings without fovea below, even, or slightly angulate, 12 veins; hind wings somewhat angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell; hind tibiæ swollen, with hair pencil in ♂; larva with 12 legs.

Species.—*M. perlata* Guen.

### 82. EUGONOBAPTA Warren.

Nov. Zool. i, 405, 1894.

Type *nivosata* Guen.

Palpi rather short, slender, porrect; tongue developed; front smooth; antennæ flattened, lamellate in ♂; thorax hairy scaled; abdomen slender, smooth; hind tibiæ of ♂ swollen, with hair pencil; two pairs of spurs in both sexes; fore wings costa strongly arched, outer margin even, without fovea at base in ♂, 12 veins, 6 separate, 10 on 9, 11 from cell; hind wings rather long, somewhat angled at 4, all veins separate.

Species.—*E. nivosata* Guen.

### 83. RIPULA Guen.

Phal. i, 34. 1857.

Type *mahometaria* H.-Sch.

Palpi moderate, porrect, scaled; tongue developed; front tufted; antennæ of ♂ doubly bipectinate, two pectinations arising from each side of each segment at ends, apex simple; thorax hairy above, densely hairy woolly below; fore wings even, scarcely bent at 4, without fovea at base in ♂, 12 veins, 10 on 9, 11 from cell, 6 shortly stemmed with 7; hind wings cell short, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*R. virginaria* Hulst.

### 84. ENNOMOS Treit.

Schm. Eur. vi (1), 3, 1827.

Type *alniaria* Linn.

*Eugonia* Hüb., Verz. 291, 1818, type *alniaria* Linn.

Palpi rather long, end member longer than usual, long haired below; tongue developed, but not strong; front densely hairy tufted;

antennæ bipectinate in both sexes, apex simple in ♀, not in ♂; thorax densely hairy above and below; abdomen scaled; femora hairy; hind tibiæ swollen, without hair pencil in ♂, with one or two pairs of spurs; fore wings without fovea below, angulate, 12 veins; hind wings angulate and wavy, 5 undeveloped, 8 separate from cell.

*Eugonia* Hüb., was preoccupied by himself, he having previously given the name to a genus of butterflies.

Species.—*E. subsignarius* Hüb.
*E. magnarius* Guen.

### 85. **XANTHOTYPE** Warren.

Nov. Zool. i, 463, 1894.

Type *crocataria* Fab.

Palpi moderate, porrect, bushy; tongue developed; front hairy, somewhat tufted below; antennæ bipectinate in both sexes, apex simple, in ♀ pectinations short, sharp; thorax hairy above; abdomen smooth; hind tibiæ swollen in both sexes, without hair pencil, with two pairs of spurs; fore wings rounded in ♂, dully angulate in ♂ at vein 4, without fovea at base in ♂, 12 veins, 6 separate, 10 on 11, 11 from cell; hind wings of ♂ slightly sinused, of ♀ deeply sinused, from 7 to 5 edge uneven, all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*X. crocataria* Fab.

### 86. **PLAGODIS** Hüb.

Verz. 294. 1818.

Type *dolobraria* Linn.

*Eurymene* Dup., Lep. Fr. vii, 185, 1829, type *dolobraria* Linn.

Palpi moderate, subascending, rough scaled; tongue developed; front smooth, or slightly tufted; antennæ of ♂ bipectinate, apex simple, of ♀ finely serrate; thorax scaled, somewhat hairy beneath; abdomen scaled, untufted; fore wings without fovea below, 12 veins, 10 and 11 from cell; the wing with a broadly rounded angle at 4, and rounded out inwardly from 3 to inner margin; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; the wings rounded out from 3 to inner margin forming rounded angle at 4; hind tibiæ without hair pencil in ♂, with all spurs, the tibiæ scarcely swollen.

Species:—

*P. serinaria* H.-Sch.
*P. keutzingaria* Pack.
*P. fervidaria* H.-Sch.
*P. alcoolaria* Guen.
*P. phlogosaria* Guen.
*P. emarginaria* Guen.

### 87. **HYPERITIS** Guen.

Phal. 117, i, 1857.

Type *amicaria* H.-Sch.

*Probole* H.-Sch., Auseu. Schm. 83, 1855, type *amicaria* H.-Sch.

Palpi ascending, stout, rather long; front rounded, broad, smooth; tongue developed; antennæ bipectinated in both sexes, apex simple, pectinations short in ♀; thorax and abdomen smooth; hind tibiæ scarcely swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings angled at 4, without fovea at base in ♂, 12 veins, 6 separate, 10 at a point, or shortly stemmed with 9, 11 from cell; hind wings with a broad angle at 4, larger in ♂, all veins separate, 5 undeveloped, 8 separate from cell.

Species:—

*H. amicaria* H.-Sch.
*H. notataria* Hulst.
*H. trianguliferata* Pack.
*H. mollicularia* Zell.

### 88. **ANIA** Steph.

Brit. Ent. Hanst. iii, 321, 1831.

Type *limbata*.

*Microgonia* H.-Sch., Auseu. Schm. 1855, type *limbata* Haw.
*Nematocampa* Guen., Phal. i, 120, 1857, type *limbata* Haw.

Palpi moderate, erect or ascending, light; tongue developed; front smooth, narrow in ♂, quadrate in ♀; antennæ ♂ lamellate, in ♂ filiform; thorax smooth, hairs of patagiæ long; abdomen smooth; legs rather heavy; hind tibiæ in ♂ much swollen, with hair pencil, end spurs small, close together, the outer upper spur normal, the inner lengthened, enlarged at end thus becoming club shaped; hind tibiæ of ♀ normal; fore wings 11 veins, 10 wanting, 11 stemmed with 9, 5 nearer 6 than 4; hind wings all separate, 5 undeveloped, 8 separate from cell.

Species.—*A. limbata* Haw.

### 89. **GONODONTIS** Hüb.

Verz. 287, 1818.

Type *bidentata* Clerck.

*Epirranthis* Hüb., 296, 1818, type *obfirmaria* Hüb.
*Odonoptera* Steph., Ill. 162, 1829, type *bidentata* Clerck.
*Metarranthis* Warr., Nov. Zool. i, 436, 1894, type *obfirmaria* Hüb.

Palpi moderate, or rather long, porrect or subascending, rough scaled; tongue developed; antennæ of ♂ bipectinate to apex, pectinations clavate, antennæ of ♀ sharply serrate; thorax hairy scaled, hairy below; abdomen scaled, untufted; femora more or less hairy;

hind tibiæ somewhat swollen or slightly so, without hair pencil in ♂, with all spurs; fore wings 12 veins, 10 and 11 from cell; without fovea below in ♂; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; wings even, somewhat wavy, or somewhat angled.

Mr. Meyrick joins *Crocallis* Treit. with this. The type of *Crocallis* is *elinguaria* L., which is also the type of *Eusarca* Hub. of the Tentamen. *Elinguaria* is not congeneric with *Gonodontis* however, as the tongue is wanting. I have joined with this genus *Epirranthis* Hüb., the type of which is *obfirmaria* Hüb., which has broad, rounded wings, but which is insensibly connected with the species having waved or angulate wings. Mr. Warren gives the name *Metarrhanthis* to *obfirmaria*, "because *pulverata* has been removed to the Orthostixinæ." *Epirranthis* was created by Hübner with two species under it, *pulverata* and *obfirmaria*. Boisduvál, finding them not congeneric, created the genus *Ploseria* with *pulverata* as type, thus leaving *obfirmaria* as type of *Epirranthis*. This was right, and the reference was, so far as I know, universally recognised by systematists till Mr. Meyrick, without explanation, put *pulverata* under *Epirranthis*. I do not believe *Epirranthis* a valid genus, but if so or not, its type is *obfirmaria* Hüb.

Hüb. Verz. 263, 1818, gave the name *Gonodonta* to a genus of Noctuidæ. Under the present recognised law of priority, the name *Gonodontis*, not being a mere distinction of gender, is not a synonym, and must not, therefore, give way to *Epirranthis*.

Species:—

*G. hypochraria* H.-Sch.
*G. warneri* Haw.
*G. duaria* Guen.
*G. pilosaria* Pack.
*G. barnesii* Hulst, n. sp.
*G. formosa* Hulst, n. sp.
*G. obfirmaria* Hüb.
*G. distichuta* Guen.
*G. antidiscaria* Walk.

**G. barnesii** n. sp.—Expands 38–40 mm. Palpi smoky brown, end member closely scaled, middle and basal members lighter colored and hairy; head rather long haired, smoky ochreous; antennæ about one-half as long as wing, pectinations stout, but rather short, smoky yellow in color; thorax long hairy, yellow, with a smoky tinge, abdomen of same color: fore wings slightly falcate, angled at end of vein 4; the wings are divided into three fields the basal reaching about one-fourth the wing on costa, the same distance on inner margin, rounding outwardly, ochreous yellow in color; the middle field has a considerably darker tinge, and is limited outwardly by a line curving inwardly near the middle and subparallel with the outer margin; this field is on both inner and outer edge within lined narrowly with smoky brown; outer field clay ocher; hind wings

light ocher, darkening outwardly, with dark wavy line near middle; discal spots on both wings distinct, black; beneath dull clay yellow, darkest at costa, outer line faintly showing, discal spots distinct, black. Legs smoky yellow, the fore tibiæ in front darker, and the epiphysis dark brown.

Greenwood Springs, Col., from Dr. Barnes. Very much like *G. tusciaria*, of Europe.

**G. formosa** n. sp.—Expands 40-42 mm. Palpi blackish on sides, whitish at end of hairs below; front dark gray, made of the blackish hairs which are whitish at the ends, or fuscous, the color then being dark fuscous. Abdomen dull white to fuscous, with scattered blackish scales; fore wings even, rounded, dark gray to fuscous basally and outwardly blackish, olive or dark fuscous on middle field; the middle field is edged with a white line on both sides, and in cases where the middle field is faded, the extreme part next the white lines shows as black lines; basal margin of middle field very oblique, beginning subcostally beyond middle reaching the inner margin close to base, after an angulation at cell and again between 1 and cell; outer line beginning near apex, running somewhat inwardly, and with two curves to inner margin; an outer submarginal dark shading, blackish or dark fuscous; hind wings light gray to fuscous, with a broad dark median cross-line, and a broad dark outer field; beneath light fuscous gray with outer line black on all wings, following outer edge of middle field above on fore wings and cross-line on hind wings.

Colorado, Dr. Barnes; S. California, Prof. Riley.

### 90. EUCHLÆNA Hüb.

Verz. 293, 1818.

Type *obtusaria* Hüb.

*Endropia* Guen., Phal. i, 122, 1857, type *pectinaria* Schif.

Palpi moderate or rather long, subascending or ascending, rough haired below; tongue strong; front scaled, untufted; antennæ of ♂ bipectinate, apex simple, of ♀ serrate; thorax scaly hairy above, hairy below; abdomen scaled, sometimes a little tufted at end; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings without fovea below, generally angulate at 4, sometimes wavy, 12 veins, 10 and 11 from cell; hind wings generally angulate at 4, generally waved, running sometimes, especially in the ♀, into scallops, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Mr. Meyrick uses this generic name in the sense of *Epione* Guen., but I think it must be placed here. Hübner placed three species, *obtusaria* Hüb., *apiciaria* Linn. and *vespertaria*, under it. The species were not congeneric. Guenée, not recognising Hübner, erected *Epione*, of which *apiciaria* is type, and with which *vespertaria* is congeneric, and put *obtusaria* under his genus *Endropia*. The rules require that Guenée's division shall be recognized, that *Epione*, the first genus described, be recognized as valid, *obtusaria* thus becoming

type of *Euchlæna*. The genus differs from *Epione* in the presence of the hair pencil, and in the simple apex of the ♂ antennæ.

Species:—

*E. hilumnaria* Hulst.
*E. geniculata* Hulst.
*E. argyllaria* Hulst.
*E. galbinaria* Hulst.
*E. manubiaria* Hulst.
*E. serrata* Dru.
*E. muzaria* Walk.
*E. obtusaria* Hüb.
*E. effectaria* Walk.
*E. occantaria* Hulst.
*E. johnsonaria* Fitch.
*E. amœnaria* Guen.
*E. vinulentaria* G. and R.
*E. astylusaria* Walk.
*E. marginata* Minot.
*E. pectinaria* Schif.
*E. sesquilinearia* Grt.
*E. falcata* Pack.

### 91. **SELENIA** Hüb.

Verz. 292, 1818 (*Eutrapela* Tentamen).

Type *bilunaria* Esp.

Palpi porrect or subascending, quite long, hairy or rough scaled; tongue developed; front with projecting scales or hair tuft; antennæ of ♂ bipectinate to apex, of ♀ sharply serrate; thorax hairy, or hairy scaled, very hairy beneath; femora very hairy; hind tibiæ not swollen, without hair pencil, with two pairs of spurs; fore wings without fovea below, angulated, 12 veins, 10 and 11 from cell, separate; hind wings waved, angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings have a transparent lunule at end of discal cell, sometimes much hidden by overlapping scales.

Species.—*S. kentaria* Grt.
*S. alciphearia* Walk.
*S. perangulata* Hulst, n. sp.

**S. perangulata** n. sp.—Expands 44 mm. Palpi yellow ocher, tinged with fuscous; front ocher fuscous; thorax ocher. Abdomen clay ocher; fore wings deep yellow costally at base, washed with deep yellow just beyond discal spot and of the same color below apex and washed with it slightly over outer space; grayish along costa and ocher over rest of wing; basal line blackish, evenly rounded; middle line more diffuse, blackish, including discal spot, slightly bent; outer line blackish, quite straight; hind wings ocher, middle line of fore wings continued, the wing more yellow outwardly; beneath lines more distinct, especially the middle one; on both wings the deep yellow color replaced by orange-brown.

Colorado, from Mr. Bruce.

### 92. **EPIPLATYMETRA** Grt.

Can. Ent. v, 145, 1873.

Type *coloradaria* Gr.

Palpi long, beak like, ascending or almost erect, end member more or less horizontal, rough scaled; tongue strong; front scale tufted;

antennæ of ♂ bipectinate, apex simple, of ♀ serrate; thorax rather hairy scaled, not tufted, hairy below; abdomen scaled; hind tibiæ somewhat swollen, without hair pencil in ♂, with all spurs; fore wings 12 veins, 10 and 11 from cell, without fovea below; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell; all wings strongly angulate.

Close to *Metanema* Guen., differing chiefly in the long, stout, ascending palpi.

Species:—

*E. coloradaria* Grt.
*E. grotearia* Pack.
*E. cervinaria* Pack.
*E. aurantiacaria* Pack.
*E. madusaria* Walk.

### 93. **SYNAXIS** n. gen.

Type *pallulata* Hulst.

Palpi long, ascending, rough scaled, end member horizontal; tongue strong; front somewhat hair tufted; antennæ deeply bidentate in ♂; thorax hairy scaled, hairy below; abdomen scaled, somewhat tufted; hind tibiæ somewhat swollen, without hair pencil; fore wings angulate, without fovea below, 12 or 13 veins, 10 and 11 from cell; hind wings somewhat angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

The only specimen of *palludata* I have has 13 veins, the 13th reaching from 12 to costa. I am convinced this is only a rare aberration, which, in a number of examples, I have found in other species. Mr. Warren has suggested a genus *Prionotetracis*, Nov. Zool. i, 461, 1894, which might be the same as this genus. He gave as type "*latistrigata* Warr. ined." Neither genus nor species having been described, it does not exist as yet, whether it be the same or different.

Species.—*S. pallulata* Hulst.
*S. oblentaria* Grt.

### 94. **PHERNE** n. gen.

Type *parallelaria* Pack.

Palpi long, ascending, beak like, rough scaled, end member horizontal; tongue strong; front cone tufted; antennæ bipectinate in both sexes, apex simple; thorax hairy scaled, hairy below; abdomen scaled, somewhat tufted; hind tibiæ somewhat swollen, with hair pencil in ♂, with all spurs; fore wings without fovea below, strongly angulate, 12 veins, 10 and 11 from cell; hind wings strongly angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Mr. Warren, Nov. Zool. i, 461, 1894, suggests a genus *Ctenotetracis* by name, without description, and without type mentioned. I am not aware any description has been given. He, it is true, says "it is like *Tetracis*, except the antennæ are pectinated in ♂." This differs very decidedly from *Tetracis* in that the antennæ of the ♀ are also bipectinate.

Species.—*P. parallelaria* Pack.
*P. jubararia* Hulst.

### 95. METANEMA Guen.

Phal. i, 171, 1857.

Type *inatomaria* Guen.

Palpi moderate, stout, heavily rough scaled; tongue strong; front scaled, sometimes somewhat tufted; antennæ of ♂ bipectinate, apex simple, pectinations filiform, of ♂ filiform or scarcely serrate; thorax hairy scaled or hairy, beneath hairy; abdomen scaled, sometimes slightly tufted; hind tibiæ of ♂ generally swollen, without hair pencil, with all spurs; fore wings without fovea below, more or less angulate and wavy, more decidedly so in the ♀, 12 veins, 10 and 11 from cell; hind wings angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species:—

*M. inatomaria* Guen.
*M. determinata* Walk.
*M. excelsa* Streck.
*M. quercivoraria* A. and S.
*M. textrinaria* G. and R.

### 96. PRYOCYCLA Guen.

Phal. i, 90, 1857.

Type *armataria* H.-Sch.

Palpi rather long, ascending or erect, stout, tongue developed; front smooth, or slightly tufted; antennæ bipectinate almost to apex in ♂, sharply serrate in ♀; thorax heavily scale haired; abdomen smooth; thorax rather woolly below; hind tibiæ of ♂ somewhat swollen, without hair pencil, rather short, two pairs of spurs in both sexes; fore wings quite evenly scalloped on outer margin in both sexes, without fovea at base in ♂, 12 veins, 6 widely separate, 10 on 9, 11 from cell separate from 10 and 12; hind wings quite evenly scalloped on outer edge, deeper and more irregular in ♀; as in the fore wings, the points of the scallops at ends of veins, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*P. armataria* Guen.
*P. decoloraria* Hulst.

### 97. SNOWIA Neum.

Pap. iv, 95, 1884.

Type *montanaria* Neum.

Palpi rather short, porrect, long haired below; tongue developed; front haired, somewhat tufted; antennæ bipectinate in ♂, pectinations short, clavate, apex simple; thorax densely hairy above and below, with long subdorsal hair tufts above from underneath patagiæ; abdomen smooth; hind tibiæ swollen, with hair pencil in ♂, with two pairs of spurs in both sexes; wings rounded, even, fore wings without fovea at base in ♂, 12 veins, 10 on 9, 11 on cell; hind wings all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*S. montanaria* Neum.

### 98. STENASPILATES Pack.

Geom. Moths, 211, 1876.

Type *meskearia* Pack.

Palpi moderate, porrect, very heavily scaled; tongue developed; front scaled, not tufted; antennæ bipectinate in ♂, filiform in ♀; thorax very heavily and loosely scaled with a dorsal crest and with a low, but heavy posterior tufting of scales; abdomen loosely scaled; hind tibiæ without hair pencil, slightly swollen in both sexes, with two pairs of spurs; fore wings outer edge sinuate, more excised below vein 3, the sinuations all more decided in ♀, without fovea at base in ♂, 12 veins, 5 nearer 6 than 4, 6 separate, 10 and 11 from cell; hind wings more deeply sinuate, especially in ♀, all veins separate, 5 undeveloped, 8 separate from cell.

Species:—

*S. zalissaria* Walk.
*S. radiosaria* Hulst.
*S. muricolor* Hulst, n. sp.
*S. meskearia* Pack.

**S. muricolor** n. sp.—Expands 34 mm. Much in general markings like *S. meskearia* Pack., but the wings are broader, more even, and the color is a bluish gray or mouse color, darkening on middle field within outer line to blackish olive; discal spots white, of raised scales. In form and general appearance it looks like a bluish gray form of *Azelina peplaria* Hüb.

San Antonio, Texas, from Mr. Rautenberg.

### 99. MARMAREA n. gen.

Type *occidentalis* Hulst.

Palpi moderate, subascending, stout, densely haired; tongue strong; front densely haired, tufted; antennæ of ♂ stout, heavy, dentate, somewhat lamellate, flattened, of ♀ filiform; thorax densely long haired, rising into a longitudinal dorsal crest, long densely hairy below; abdomen rough scaled; femora hairy, hind tibiæ not swollen, without hair pencil, with all spurs; fore wings without fovea below,

wavy, angulate, 12 veins, 10 and 11 from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell, the wings wavy angulate.

Species.—*M. occidentalis* Hulst, n. sp.

**M. occidentalis** n. sp.—Expands 40–50 mm. Very much like *Azelina peplaria* var. *hubnerata*, but considerably larger, and heretofore catalogued as the Pacific form of that variety. It may be distinguished by the antennæ of the ♂, and is probably a "species darwiniana," in which the colors have persisted, while the antennal structure is modified.

California.

### 100. **AZELINA** Guen.

Phal. i, 156, 1857.

Type *peplaria* Hüb.

Palpi moderate, subascending, stout, generally heavily scaled; tongue developed; front heavily hair tufted; antennæ flattened, naked in ♂; thorax heavily and loosely haired, with a distinct dorsal crest; abdomen loosely scaled; thorax densely woolly below; hind tibiæ not swollen, without hair pencil, with two pairs of spurs; fore wings without fovea at base in ♂, falcate, wavy angulate, 12 veins, 5 nearer 6 than 4, 10 and 11 from cell; hind wings wavy, dull angled at 2, more decided in ♀, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*A. peplaria* Hüb. (hubnerata *Guen.*)
*A. behrensata* Pack.

### 101. **SYSSAURA** Hüb.

Zutr. ii, 13, figs. 247, 248.

Type *drepanulata* Hüb.

*Patalene* H.-Sch. Auseu. Schm. 80, 1855, type *falcularia* Sepp.
*Microsemia* H.-Sch., Auseu. Schm. 83, 1855.
*Hyperythra* Guen., Phal. i, 99, 1857.
*Hypsosidra* Butl., Proc. Zool. Soc. p. 492, 1878.

Palpi short, stout, rather rough scaled, subascending or ascending; tongue strong; front scaled, slightly tufted; antennæ of ♂ bipectinate, apex simple, of ♀ serrate; thorax scaled, somewhat hairy below; abdomen scaled; hind tibiæ swollen, with hair pencil in ♂, with all spurs; fore wings without fovea below, strongly falcate, rounded, 12 veins, 10 and 11 stemmed from cell; hind wings even, rounded, anal angle prominent, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

The description is from the American species as I do not know the type of the genus. Mr. Warren is responsible for the application of this name to the N. A. species heretofore listed under *Drepanodes* Guen. Guenée has two groups under *Drepanodes*, the latter with

pectinated antennæ falling under *Syssaura* Hüb. and the former with simple pubescent antennæ in the ♂, being by Mr. Warren put under *Drepanodes*. Mr. Warren says the species of *Syssaura* have elongate fore wings, and short, straight pectinations of the ♂ antennæ, while the species of *Patalene* have fully pectinated antennæ and less falcate fore wings. Whether these distinctions will hold good I cannot say. They seem scarcely distinctive. *Siculata* is placed by Guenée under the first group (*Drepanodes*), but as he had only the ♀, and as I also have no ♂, I am unable to verify the correctness of the reference. It is quite likely not *Syssaura* in the above sense, as the antennæ of the ♀ are filiform not serrate, and the fore wings decidedly falcate.

Species.—*S. siculata* Guen.
*S. syzygyaria* Hulst.
*S. infensata* Guen.

### 102. CABERODES Guen.

Phal. i, 135, 1857.

Type *confusaria* Hüb.

Palpi moderate, subascending, rough scaled; tongue strong; front scaled, scarcely tufted; antennæ of ♂ bipectinate, apex simple, of ♀ serrate; thorax scaled, slightly hairy, hairy below; abdomen scaled; hind tibiæ slightly swollen, without hair pencil, with all spurs; fore wings rounded or very slightly angulate, without fovea below, 12 veins (in one specimen 13), 10 and 11 from cell, stemmed together at base; hind wings rounded or slightly angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

The genus is scarcely to be separated from *Metanema* Guen. Mr. Warren, giving the synonymy, says it is the same with *Apicia* Guen., which it is not, as *Apicia* has hair pencil in ♂. Then Mr. Warren refers the term *Caberodes* for the first species described by Guenée, and puts the American species under *Eusarca* Hüb. as Hübner described *confusaria* under that generic name. But in his description of *Caberodes* Guenée gives the structure of the males, and also gives a description of the larva. Of the species to which Mr. Warren would refer *Caberodes* Guenée says he had the ♀ only, and did not know the ♂, nor the larva. The ♂ described is *confusaria*, and the larva is the larva of *confusaria*. *Caberodes* cannot in anywise be therefore referred to anything but *confusaria*. With regard to *Eusarca* in the Exot. Schmet., there is no pretense to binomial nomenclature, and no generic names can be taken from what is descriptive merely. Hübner's first use of the term in anything like

the binomial sense was in the Tentamen with *elinguaria* as type. So *Eusarca* can in no wise be properly used as a generic term to include *Caberodes*.

Species.—*C. juncturaria* Guen.
*C. confusaria* Hüb.
*C. majoraria* Guen.

### 103. **OXYDIA** Guen.

Phal. i, 52, 1857.

Type *vesulia* Cram.

Palpi moderate, ascending or erect, heavy, densely scaled or haired; tongue developed; front haired, more or less tufted; antennæ flattened, sublamellate, somewhat fascicled with hairs; thorax densely hairy above and below; abdomen smooth; femora haired, hind tibiæ swollen, with hair pencil in ♂, with two pairs of spurs in both sexes; fore wings even, not angulated, without fovea at base in ♂, 12 veins, 6 near 7, 10 and 11 from cell; hind wings rounded, even, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

Species.—*O. zonulata* Hulst.
*O. vesulia* Cram.

### 104. **TETRACIS** Guen.

Phal. i, 140, 1857.

Type *crocallata* Guen.

Palpi moderate, subascending, rather heavy, rough scaled; tongue strong; front scaled; slightly tufted, broad; antennæ of ♂ flattened, dentate, naked; thorax hairy scaled, hairy below; abdomen scaled; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings pointed, angulate, without fovea below, 12 veins, 10 and 11 on cell; hind wings angulate, 5 undeveloped, 6 and 7 separate, 8 separate from cell.

*Truxaliata* Guen. has ordinarily been regarded as the type of *Tetracis*, but that species is congeneric with *ægrotata* Guen., the type of *Sabulodes*. *Crocallata* Guen., described also under *Tetracis*, differs from *truxaliata* generically, and I apply Guenée's generic term to it as type.

Species.—*T. crocallata* Guen.

### 105. **SABULODES** Guen.

Phal. i, 42, 1857.

Type *caberata* Guen.

*Chærodes* Guen., Phal. i, 35. 1857, type *transversata* Dru.
*Antepione* Pack., Geom. Moths 484, 1876, type *depontanata* Grt.
*Prochærodes* Grt., An. Mag. Nat. Hist. 55, 1883, type *transversata* Dru.

Palpi moderate, scaled, porrect or ascending, rough scaled; tongue strong; front rough haired, somewhat tufted; antennæ of ♂ simple,

flattened, nearly naked, somewhat lamellate, of ♀ simple, filiform; thorax rather long hairy above and below, tufted anteriorly; abdomen scaled, slightly tufted at end; hind tibiæ of ♂ swollen, with hair pencil, with all spurs; fore wings without fovea below, 12 veins, 10 on 11 stemmed from cell; hind wings 5 undeveloped, 6 and 7 separate, 8 separate from cell.

I can see no valid reason why *Sabulodes*, *Antepione* and *Prochærodes* should not be regarded as one genus. *Sabulodes* and *Antepione* have the antennæ of the ♂ more flattened and naked, but the antennæ of *Prochærodes* are flattened and but shortly ciliate. The tendency to the lamellate form of segments is present in all the species though more marked in the *Sabulodes* group. There is some variation in wing shape, but the variation is one of not very wide degree, not of kind. The angulation of the hind wings is not distinctive, as the varieties of *S. transversata* cover both forms. The angulation of the fore wings differs, as does the amount of falcation beneath apex, but this also differs in the single species as well as in the sexes of some of the species. I think when a close examination is made it will be agreed the differences, so far as knowledge at present goes, are more apparent than real. *Oxydia* is very close, and scarcely to be separated. *Politia* Cram. is put by Mr. Butler under the genus *Nepheloleuca*, but I have not been able to find the description.

Species:—

*S. truxaliata* Guen.
*S. lorata* Grt.
*S. sulphurata* Pack.
*S. depontanata* Grt.
*S. novellata* Hulst.
*S. caberata* Guen.
*S. anfractata* Hulst.
*S. catenulata* Grt.
*S. nubilata* Pack.
*S. furciferata* Pack.
*S. transversata* Dru.
*S. politia* Cram.

### 106. **ABBOTTANA** n. gen.

Type *clematata* Ab. Sm.

Palpi moderately long, ascending or erect, stout, heavily scaled; tongue developed; front hair tufted; antennæ of ♂ shortly bipectinate, the pectinations scarcely more than dentations, with a fascicle of hairs at the summit of each; thorax densely hairy above, densely woolly below; abdomen smooth; femora somewhat hairy, hind tibiæ swollen, without hair pencil in ♂, with two pairs of spurs in both sexes; fore wings falcate, very strongly so in ♀, scarcely angulate at 4, without fovea below in ♂, 12 veins, 10 on 9, 11 on cell; hind wings rounded, slightly wavy, slightly angulate at 4, more decidedly so in ♀, all veins separate, 5 undeveloped, 8 separate from cell.

Species.—*A. clemataria* Ab. and Sm.

## PALYADINÆ.

This subfamily is tropical, the two species of our fauna occurring only in the southern part of Florida. They are characteristically and peculiarly marked by the absence of the frenulum, which feature may warrant family distinction. The Geometrid character of the family is shown by the strongly marked angle at base of vein 8 in the hind wings.

### Synopsis of Genera.

Abdomen of ♂ untufted.....1. **Palyas.**
Abdomen of ♂ with lateral tufts on fifth segment.....2. **Phrygionis.**

### 1. **PALYAS** Guen.

Verz. 307, 1818.

Type *aura* Cram.

Palpi moderate, bushy, ascending, close to front; tongue developed; front narrow, tufted; antennæ of ♂ bipectinate, apex simple, thorax smooth, somewhat tufted posteriorly; abdomen smooth; legs slender, hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; wings even, rounded, with metallic bands and spots; fore wings 12 veins, 10 on 9, 11 from cell; hind wings all veins separate, 8 close to cell one-half its length, then separating at a sharp angle.

Species.—*P. auriferaria* Hulst.

### 2. **PHRYGIONIS** Hüb.

Verz. 307, 1818.

Type *argentata* Dru.

*Byssodes* Guen., Phal. i, 399, 1857, type *argentata* Dru.

Palpi moderate, bushy, ascending, close to front, rather stout; tongue developed; front narrow, short, tufted; antennæ shortly bipectinate in ♂, filiform, slightly flattened, naked in ♀; thorax smooth; abdomen smooth, with subdorsal hair tuftings at extremity of fifth segment in ♂; legs long, slender, hind tibiæ not swollen, without hair pencil, with two pairs of spurs in both sexes; fore wings without fovea at base in ♂, 12 veins, 6 separate, 10 on 9, 11 on cell; hind wings all veins separate; 8 close to cell one-half its length, then separating at a broad angle; all wings with metallic bands and spots; hind wings angled at 4.

Species.—*P. argenteostriata* Streck.

## MECOCERATINÆ.

The Mecoceratinæ have scarcely any representatives in our fauna, and this subfamily, while tropical, has few representatives in any part of the world. They are easily recognised by the extreme length and slenderness of the antennæ and legs, which in them becomes a

marked characteristic. The front is very much shortened and the lower part protruded so the proboscis seems to come directly in front of and between the eyes. The venation also is peculiar, 11 being on a stem with 7, 8, 9 and 10, and so far out as to be at its base nearer the end of the wing than the base of the stem.

Synopsis of Genera.

Palpi erect, recurved ..... 1. **Mecoceras.**
Palpi porrect, or subascending ..... 2. **Almodes.**

1. **MECOCERAS** Guen.

Phal. i, 388, 1857.

Type *nitocris* Cram.

Palpi erect, recurved, exceeding head, not long scaled, end member short; front with a scale tuft; tongue developed; antennæ very long, bipectinate in ♂, subdentate in ♀, with two spinous hairs at the end of each segment; legs very long, slender, the hind tibiæ with two pairs of spurs; fore wings 12 veins, 3 and 4 separate, 6 separate, 7, 8, 9, 10 and 11 on one stem; hind wings 3 and 4 from a point, 6 and 7 short stemmed, 5 undeveloped.

Species.—*M. nitocris* Cr.

2. **ALMODES** Guen.

Phal. i, 389, 1857.

Type *terraria* Guen.

Palpi rather long, porrect or ascending, slender, rather heavily scaled; front scale tufted; tongue developed; antennæ very long, bipectinate in ♂; legs very long and slender; hind tibiæ with two pairs of spurs; fore wings 12 veins, 3 and 4 separate, 6 separate; 7, 8, 9, 10 and 11 on a stem; hind wings 3 and 4 from a point, 6 and 7 short stemmed, 5 undeveloped.

Species.—*A. terraria* Guen. (rivularia *Grt.*)

## MELANCHROIINÆ.

Only one genus, the typical one of this subfamily, has been found in the United States, if, indeed, that has been found here. In our catalogues several species are enumerated, and it is possible all may be found in the extreme south of Florida, but I have been able to find no record of the capture of any of them save *cephise* Cram. within our limits.

This subfamily had always been regarded as Lithosian till its larva was discovered, which showed it to be a true Geometer. It is, however, not typical, as the base of vein 8 of hind wings is scarcely bent, and is not angulated.

The species are brightly colored, as a rule, and decidedly showy in appearance.

**MELANCHROIA** Hüb.

Type *cephise* Cr.

Palpi moderate, porrect, not heavy; front smooth; tongue strong; antennæ of ♂ bipectinate; legs rather long, slender; hind tibiæ with two pairs of spurs; fore wings 11 veins, 3 and 4 separate, 5 wanting, 6 and 7 stemmed; 8, 9 and 10 stemmed, 11 from cell; hind wings 3 and 4 separate, 6 and 7 from a point, 5 undeveloped.

Species.—*M. cephise* Cr.

## EXPLANATION OF PLATE X.

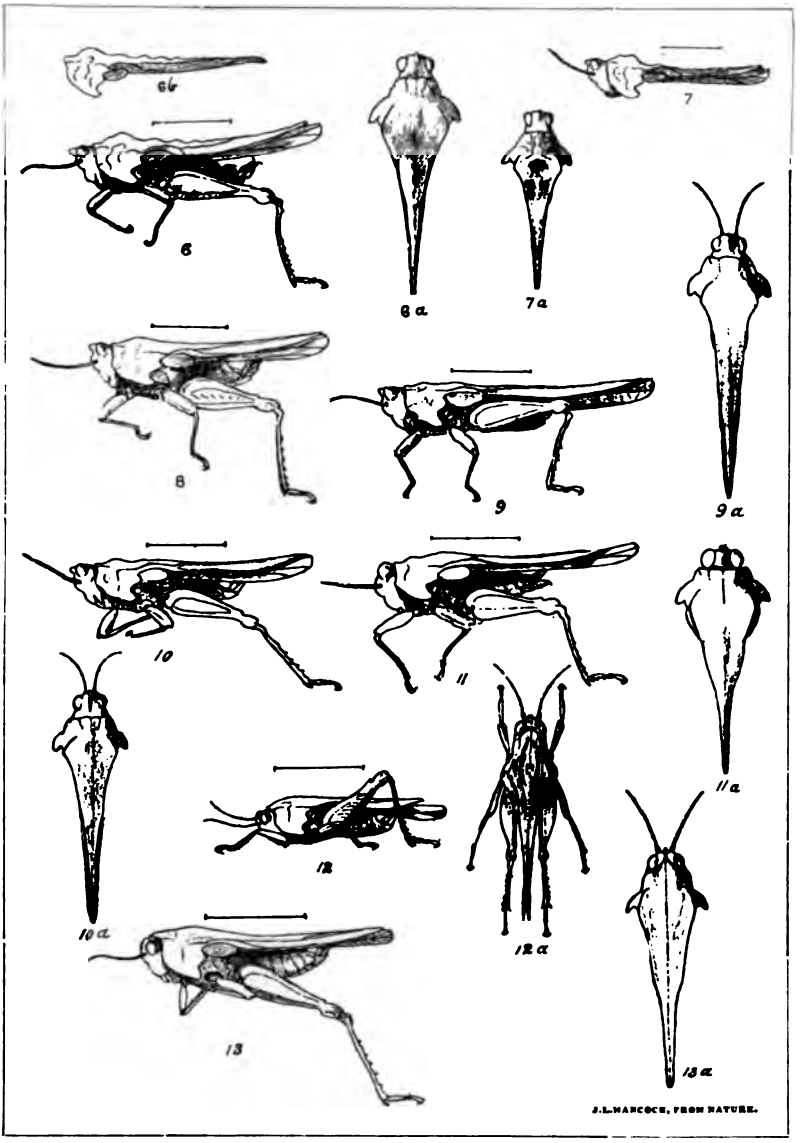
Fig. 1. Fore wing of *Hydriomena trifasciata* Bork. (after Packard).
" 2. " " *Zenophleps lignocolorata* Pack.
" 3. " " *Opheroptera boreata* L., ♂ (after Packard).
" 4. " " *Brephos infans* Moesch (after Comstock).
" 5. " " *Leucula lacteolaria* Hulst.
" 6. " " *Synelys ennucleata* Guen. (after Comstock).
" 7. " " *Calledapteryx dryopterata* Grt. (after Packard).
" 8. " " *Anaplodes remotaria* Walk. (after Comstock).
" 9. " " *Caripeta angustiorata* Walk. (after Comstock).
" 10. " " *Mecoceras nitocris* Cram.
" 11. " " *Melanchroia cephise* Cram.
" 12. Hind wing of *Hydriomena trifasciata* Bork.
" 13. " " *Dyspteris abortivaria* H.-Sch. ♂ (after Comstock).
" 14. " " *Eudule mendica* Walk. (after Comstock).
" 15. " " *Brephos infans* Moesch. (after Comstock).
" 16. " " *Leucula lacteolaria* Hulst.
" 17. " " *Synelys ennucleata* Guen. (after Comstock).
" 18. " " *Caripeta angustiorata* Walk. (after Comstock).
" 19. Humeral angle of hind wing of *Eudule mendica* Walk. (after Comstock).

## EXPLANATION OF PLATE XI.

Fig. 1. Section of antenna of *Caripeta divisata* Walk. ♂.
" 2. " " *Sympherta marcessaria* Pack. ♂.
" 3. " " *Gonodontis formosa* Hulst ♂.
" 4. " " *Lychnosea helviolaria* Hulst ♂.
" 5. " " *Ripula mahometaria* H.-Sch. ♂.
" 6. " " *Abbottana clemataria* Ab. and Sm. ♂.
" 7. " " *Erannis defoliaria* L. ♂.
" 8. " " *Ectropis crepuscularia* Schif. ♂.
" 9. " " *Marmarea occidentalis* Hulst ♂.
" 10. " " *Sabulodes caberata* Guen. ♂.
" 11. Palpus of *Lytrosis unitaria* H.-Sch.
" 12. " *Catopyrrha coloraria* Fab.
" 13. " *Mycterophora longipalpata* Hulst ♂.
" 14. Fore tibia of *Fernaldella fimetaria* Grt.
" 15. " " *Euaspilates spinitaria* Pack.
" 16. " " *Epimecis hortaria* Guen.
" 17. " " *Synelys ennucleata* Guen.
" 18. Hind tibia of *Fernaldella fimetaria* Grt.
" 19. " " *Mecoceras nitocris* Cram.
" 20. " " *Sabulodes transversata* Dru. ♂.
" 21. " " *Ania limbata* Haw. ♂.

# ERRATA.

Page 249, line 6 from top, for vein absent *read* vein 5 absent.
" 249, line 13 from top and line 5 from bottom; also page 254, lines 14 and 15 from bottom: also page 255, lines 11 and 17 from top; also page 311, lines 7 and 10 from bottom, for Hydriominæ *read* Hydriomeninæ.
Page 258, line 13 from bottom, for Ennomiinæ *read* Ennominæ.
" 287, line 13 from top, for Xanthorhœ *read* Xanthorhöe.
" 289, line 11 from top, for Melanchoria *read* Melanchroia.
" 298, line 11 from bottom, for *fuscaria* read *perfuscaria*.
" 300, before all species under Leucophthalmia in place of C place L.
" 303, line 20 from top, for *laretaria* read *lautaria*.
" 317, for Leuculidæ *read* Leuculinæ.
" 322, line 9 from bottom; also page 326, line 9 from top, for Choraspilates *read* Chloraspilates.
" 341, before all species of Euemera, in place of A place E.
" 343, line 8 from bottom, for insects *read* insect.
" 368, between lines 6 and 7 from top, place species *S. vulneraria* Hüb.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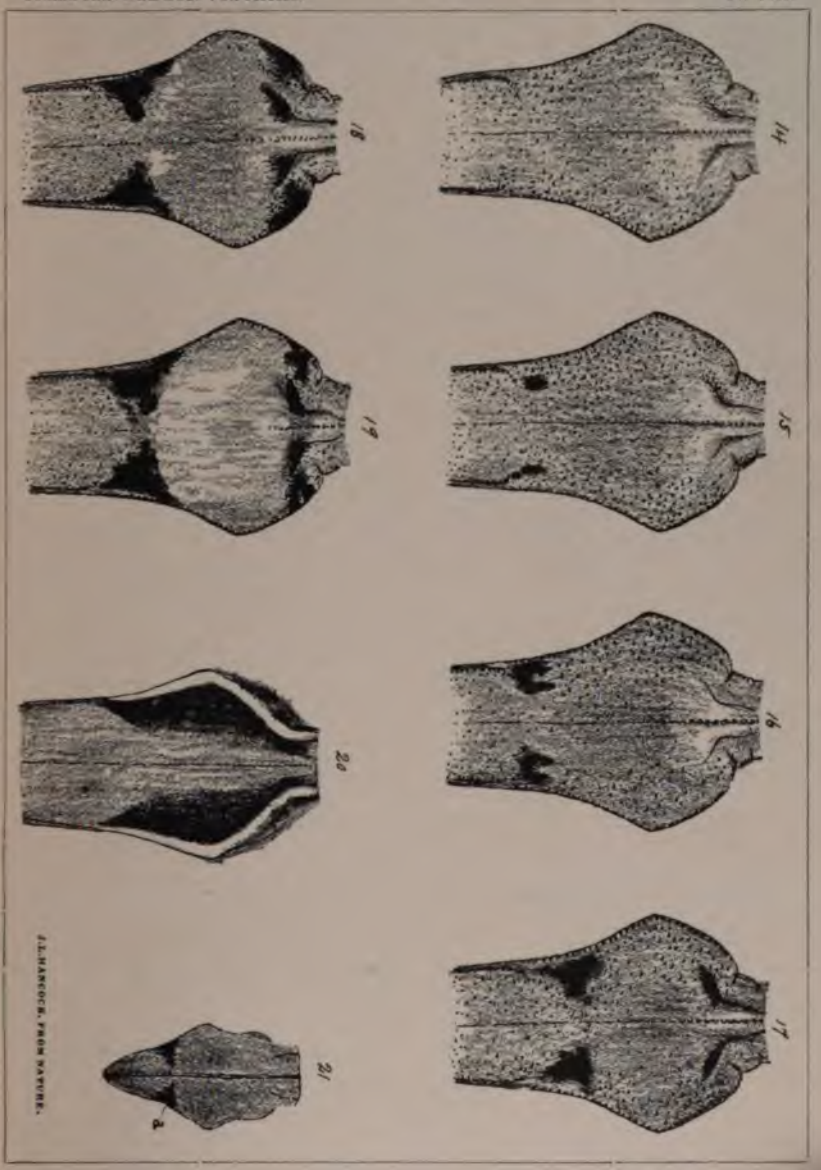
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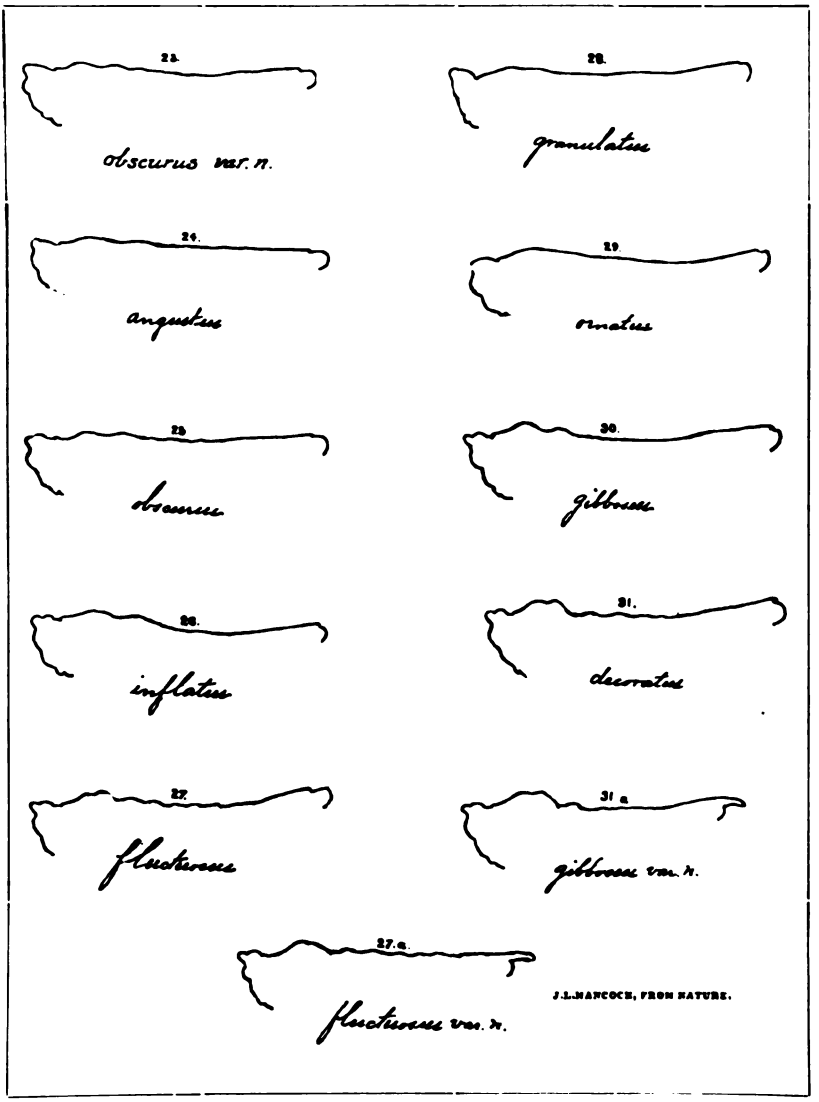
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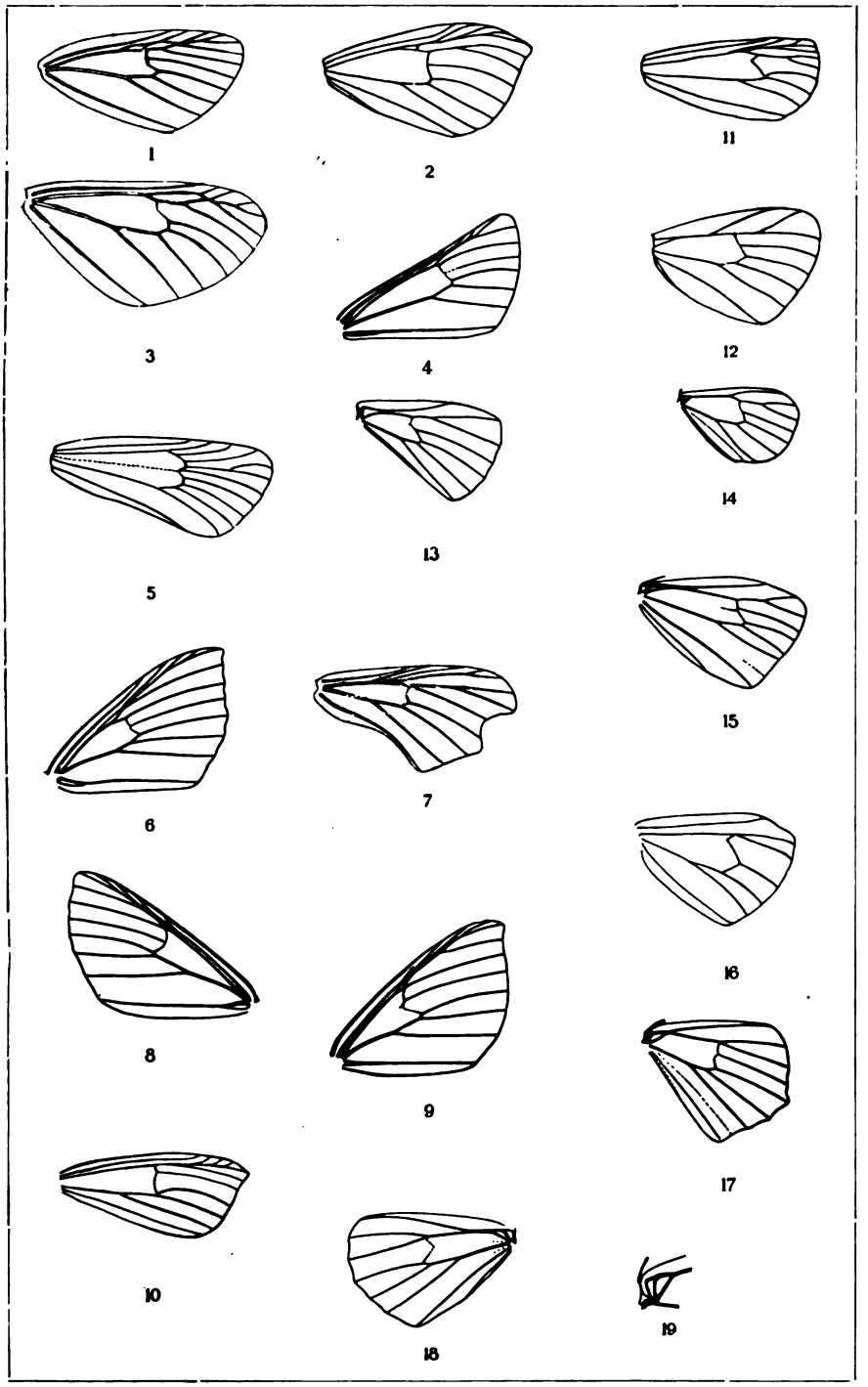
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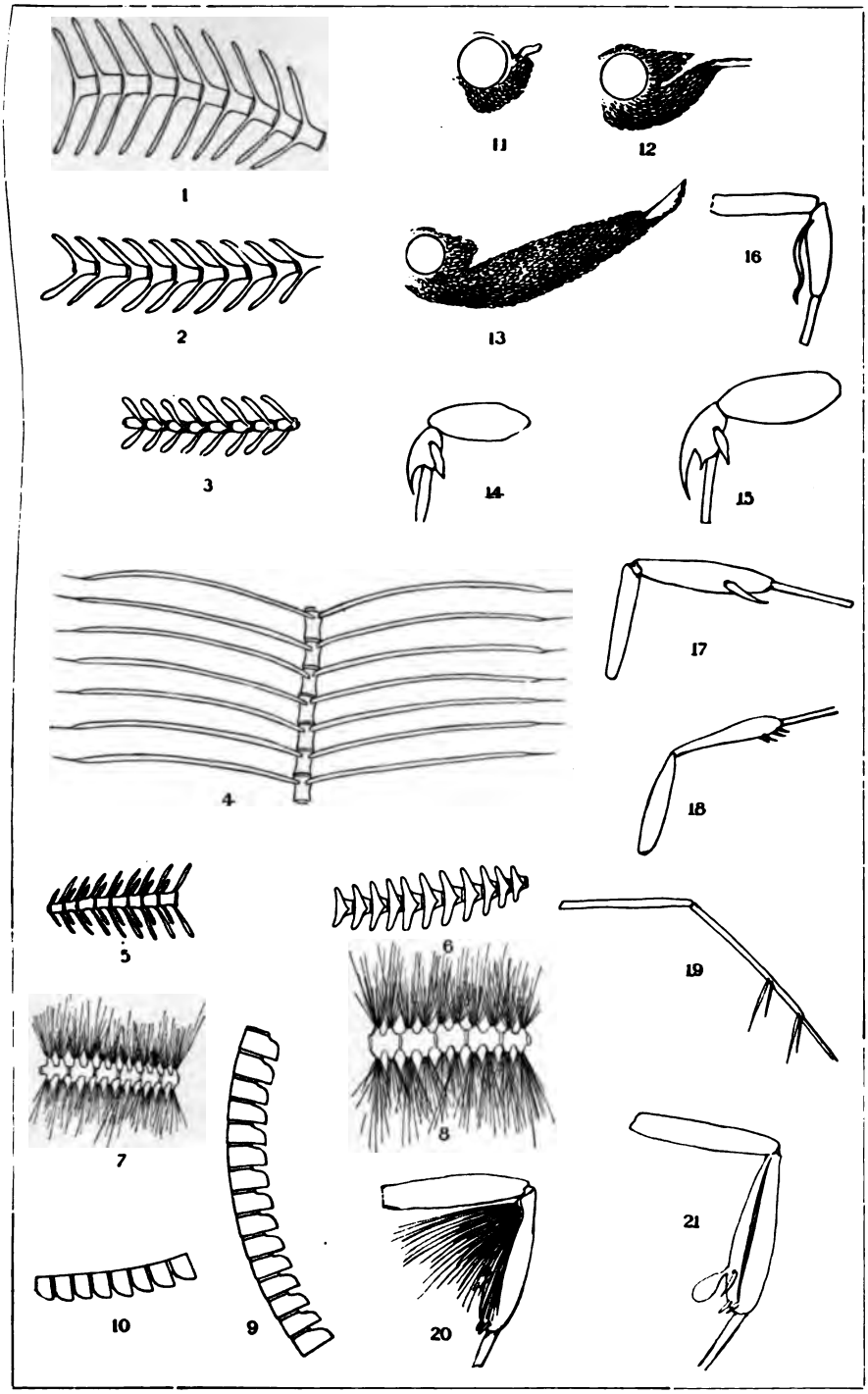
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# REVISION OF THE GENERA AND SPECIES OF CEUTORHYNCHINI INHABITING NORTH AMERICA.

BY WILLIAM G. DIETZ, M.D.

Since the publication of my paper on the Desmori of North America, the greater part of my spare time has been devoted to a study of our North American Ceutorhynchini. To make these studies as complete as possible I have also examined a large number of foreign, especially European species, representing, with one exception (Mecysmoderes), all the genera of this tribe described by Lacordaire.

Before proceeding to the elucidation of the subject proper, I desire to call attention to a few characters which, to the best of my knowledge, have escaped observation heretofore. The formation of the ventral segments presents certain modifications, of which I have made use in the classification of the genera.

1. The second ventral segment fully as long or longer than the two following segments together, the latter always short, the third segment not narrowed on the sides by a prolongation of the hind angles of the preceding segment. Pl. xiii, fig. 19*a*.

2. The second ventral segment scarcely as long or shorter than the two following segments, hind angles prolonged, the prolongation intervening to a greater or less extent between the third segment and the lateral margin of the abdomen and showing thus a tendency to the Tychini. Pl. xii, fig. 1.

Another character, though of a sexual nature only, is this, that in the majority of the species the middle and posterior tibiæ (generally) of the males are unguiculate at the apex, while unarmed in the females, and occurs especially in the first three subtribes.

Aside from this last-mentioned character the sexes can, as a rule, be readily distinguished. The males have the beak stouter and less elongate, the antennæ less slender and inserted nearer the apex (rarely the same in both sexes), and by the fifth ventral segment being subtruncate and frequently foveate.

## Family CURCULIONIDÆ.

### Tribe CEUTORHYNCHINI.

Beak variable, very slender, filiform in Mononychi, slender in Ceutorhynchi, somewhat stouter in *Cœliodes*, until in the subtribe Phytobii the beak becomes quite robust and short in some of the species. Scrobes lateral or infra-lateral, directed against the eyes, more rarely oblique and directed beneath the eyes (*Phytobii veri*).

Antennæ generally slender, funicle 6- or 7-jointed, club variable, from short ovoidal to elongate, acuminate. Eyes rather large, finely granulated, never closely approximate above, more or less concealed in repose by prothoracic lobes (except *Phytobii veri*). Head subconinal, occiput carinate; prothorax generally wider than long, narrowed in front, with lateral tubercles distinct in almost all, postocular lobes more or less developed in all except *Phytobii veri;* scutel very small or not visible. Elytra broadly oval, convex, in the majority of species, more rarely elongate, generally distinctly wider at the base than the prothorax and separately rounded at the apex. Pygidium nearly perpendicular, exposed, larger in the males than in the females, with a transverse elevated line (except *Mononychus*), a continuation of the lateral margin of the abdomen and against which the apex of the elytra abuts. In front of this elevated line is a short carina. Prosternum canaliculate, the canal sometimes effaced before the anterior coxæ (Phytobii), of variable length in front of the latter, with or without antecoxal ridges, more or less deeply emarginate for the reception of the beak in repose; mesosternum canaliculate or excavate in Mononychi and *Cœliodes*, declivous and entire in Ceutorhynchi and Phytobii (depressed and transversely sulcate in *Rileyonymus*); side pieces wide, ascending between the prothorax and the humeral angle of the elytra and generally visible from above; metasternum canaliculate in *Mononychus* (and some foreign *Cœliodes*), emarginate or excavate anteriorly in some *Cœliodes* and forming the posterior limit of the pectoral canal, entire in Ceutorhynchi and Phytobii. First ventral segment longer than the second and separated from it by a straight suture (see above); sutures 2–4 deeply impressed and curved backward on the sides. Fifth ventral segment longer than either of the two preceding segments (except *Rileyonymus*); anterior coxæ conical, not contiguous, middle coxæ rounded, entirely enclosed by the coxal cavities (open within in *Rileyonymus*) and generally more widely separated than the anterior,

posterior coxæ small. Legs variable, generally slender, never very stout; femora mutic or dentate, more or less clavate (posterior strongly incrassate in *Orchestomerus*); tibiæ very variable, acutely angulate near the base in *Chemogonus* and *Craponius*, external apical angle of the anterior tibiæ produced into a toothed process in *Chemogonus* and *Acanthoscelis*, the middle and posterior frequently emarginate above the apex, the emargination generally with a row of stiff bristles; tarsi generally slender, third joint bilobed, rarely narrow (*Rileyonymus*, *Phitobias*). Claws bifid, toothed or simple; a single claw only in *Mononychus*.

I have followed Dr. LeConte in arranging the genera under four well defined primary divisions, to which, however, I prefer to apply the term "subtribe" instead of "group," as was done by that author. Lacordaire included *Mononychus* among his *Cœliodes*, but the extraordinary characters presented by that genus fully warrant the plan adopted by Dr. LeConte.

The subtribes are distinguished as follows:

Pygidium without transverse line for the reception of the elytra, pectoral groove extended upon the metasternum, tarsi with a single claw.... *Mononychi.*

Pygidium with transverse line for reception of the elytra and carinate in front, tarsi with two claws.

Pectoral groove extending upon the mesosternum, rarely upon the metasternum. *Cœliodes.*

Pectoral groove not extending upon the mesosternum.

Beak long and slender..... *Centorhynchi.*

Beak stout, generally short..... *Phytobii.*

## Subtribe *Mononychi.*

But a single genus constitutes this tribe. Easily recognized by the transverse elevated line of the pygidium, the narrow, sharply defined pectoral groove extending well upon the metasternum and the single tarsal claw. The pygidium is quite protuberant in the male, smaller and excavate in the female; beak long and slender, antennæ with 7-jointed funicle; second ventral segment as long at middle as the two following segments united, the latter with a median glabrous space, third segment not narrowed at the extremities. Legs slender, articulating surfaces of the tibiæ ascending, margined with a row of stiff setæ and permitting of complete extension of the tarsus upon the tibiæ; tarsi moderate, third joint broadly bilobed, fourth rather short, with a single claw.

The genus *Mononychus* Germ. is represented in our fauna by a single species.

**M. vulpeculus** Fab.—Our largest Centorhynchid. Broadly ovate, above densely clothed with black scales; underside of body, sides of prothorax and sutural line, with fulvous scales. Length 4.5–5.0 mm.; 0.18–0.20 inch.

*Hab.*—Atlantic slope.

The male has the pygidium protuberant, the fifth ventral segment strongly foveate and the middle and posterior tibiæ strongly unguiculate at the apex. Female: pygidium excavate, fifth ventral very convex and protuberant towards the apex; tibiæ not armed at the apex. As the description of this species by Fabricius antedates that of Boheman, I accord to the former the authority.

## Subtribe *Cœliodes.*

In all the species of this subtribe the sternal canal extends upon the mesosternum, more rarely the metasternum. The eyes are more or less completely covered in repose by prothoracic lobes; beak somewhat variable, generally long and rather slender, the antennal funicle 7-jointed; sternal side-pieces wide, middle coxal cavities open or closed within, ventral segments variable; the legs are long and slender, femora moderately stout, rarely (*Orchestomerus*) dilated, more or less deeply grooved beneath for the partial reception of the tibiæ in repose, except *Acallodes* and *Cœliodes;* tarsi slender, third joint bilobed, tarsi with two claws, the latter armed with a tooth of variable length.

The following genera are indicated:

Second ventral segment shorter at the middle than the two following united, prolonged at the sides, third segment narrowed at its extremities, not or narrowly attaining the lateral margin; femora mutic, grooved for the reception of the tibiæ. Pl. xii, fig. 1.

- Tibiæ flattened, acutely angulate or dentate near the base. Pl. xii, fig. 2.
  - Pectoral canal extending upon the metasternum..... **Craponius.**
  - Pectoral canal not extending upon the metasternum..... **Cnemogonus.**
- Tibiæ not flattened nor dentate near the base.
  - Outer angle of anterior tibiæ produced into a toothed process. Pl. xii, fig. 9. **Acanthoscelis.**
  - Outer angle of anterior tibiæ not produced.
    - Posterior femora normal, or at least not conspicuously dilated.
      - Surface not conspicuously uneven, without crests of erect scales. **Aulentes.**
      - Surface very uneven, elytra with crests of erect scales. Pl. xii, fig. 16. **Pelenosomus.**
    - Posterior femora dilated. Pl. xii, fig. 17*a;* Pl. xiii, fig. 18*b*. **Orchestomerus.**

Second ventral segment longer at the middle than the two following united, third segment not narrowed externally, fully attaining the lateral margin; femora dentate, not grooved for the reception of the tibiæ. Pl. xiii, fig. 19*a*.

Metasternum very short, elytra widest behind the middle.....**Acallodes.**

Metasternum of moderate length, elytra not widened behind the middle. **Cœliodes.**

## CRAPONIUS Lec.

Beak somewhat stout, curved and punctured, slightly widened toward the apex, scrobes expanded posteriorly, the upper margin attaining the middle of the eye, antennæ inserted at the middle (♂) or two-fifths from the base (♀), slender, first joint stout, short, second long and slender, and nearly equal in length to the three following joints united, club abrupt, large, first joint occupying more than one-half of its mass. Eyes oval, partially covered in repose; prothorax transverse, strongly narrowed anteriorly, surface uneven, quadri-tuberculate, anterior pair of tubercles larger, obtuse, posterior smaller, acute; base bisinuate, produced in front of scutel, latter very small, glabrous. Elytra suddenly wider than the prothorax and wider than long, humeri protuberant; sternal side-pieces scarcely visible from above; prosternum long in front of the coxæ; pectoral sulcus deep, prolonged to the end of the metasternum. Abdomen short, second ventral segment shorter than the two following together, prolonged at the sides to the fourth segment, the third not attaining the lateral margin; sutures 3 and 4 deeply impressed, fifth segment about as long as the first; pygidium with ill-defined longitudinal furrow; femora not toothed, deeply grooved for the reception of the tibiæ, latter flattened, acutely angulate near the base, sulcate along the external margin for the reception of the tarsi, latter with the third joint very broadly bilobed, fourth rather short, claws armed with a slender tooth about half the length of the former.

Form very robust, subtrapezoidal, coarsely sculptured. The only species known may readily be recognized by the above generic characters.

**C. inæqualis** Say. Pl. xii. fig. 1.—Dark piceous, beak and legs reddish brown, above densely clothed with small, closely adherent chocolate colored scales, intermixed with a fine, white, scale-like pubescence arranged in spots and irregular, transverse lines on the elytra; underside nearly subglabrous, coarsely punctured, each puncture bearing a white filiform scale; prothorax with entire dorsal channel, another less sharply defined, oblique groove extends from the middle of the base each side to between the posterior and anterior tubercles; elytra with

well impressed striæ, strongly and approximately punctured, interspaces unequal, alternately wider and more prominent. Length 2.7-3.0 mm.; 0.11-0.12 inch.

♂. Last ventral segment with longitudinal, deeply impressed fovea.

*Hab.*—Middle, Southern and Western States.

## CNEMOGONUS Lec.

This genus was established by Dr. LeConte on a species supposed by him to be identical with the European *Cœliodes epilobii* Payk., an insect to which it bears but the most superficial resemblance; a curious circumstance is the fact that the author had the true *C. epilobii* before him, but failing to recognize it, described it as *C. cruralis.* The beak is rather stout, feebly curved and slightly widened toward the apex, the scrobes expanding posteriorly, their upper margin directed against the middle of the eye, antennæ rather stout, funicle 7-jointed, joints 1–2 elongate, 3–4 shorter, equal, 5–7 subtransverse, club large, the first joining forming more than one-half its mass, inserted two-fifths from the apex (♂), or at the middle (♀). Eyes ovate, obtusely acuminate inferiorly, entirely lateral and widely separated above; front flattened, without elevated orbital margin; prothorax wider than long, rounded on the sides and constricted behind the apical margin, basal margin straight each side, produced at the middle; scutel very small. Elytra wider at the base than the prothorax, longer than wide; pectoral canal deep, not extending upon the metasternum; mesosternal side-pieces wide, distinctly visible from above; second ventral segment shorter than the two following combined, third segment narrowed at the sides, attaining the lateral margin more narrowly in the male than in the female; pygidium convex, middle coxal cavities closed within, a trifle more widely separated than the anterior; femora mutic, tibiæ flattened with a large triangular tooth near the base, the external apical angle of the anterior pair produced into a toothed process similar to *Acanthoscelis*, articulating surface of middle and posterior tibiæ ascending with a triangular tooth one-third above the apex, emarginate between this and the subbasal tooth, tarsi with the third joint broadly bilobed, fourth long and slender, claws long and slender, divergent and armed with a short, acute tooth.

One species.

**C. Lecontei** sp. n. Pl. xii, fig. 2.—Stout, subtrapezoidal, pitchy black, densely clothed above with blackish scales intermixed with a short, whitish pubescence, condensed in a cruciform scutellar spot and less defined, smaller spots on the disc of the elytra. Beak subcarinate, punctured; prothorax densely and

rather finely punctured, except along the basal margin, where the punctures become somewhat larger; dorsal channel distinct in its basal two-fifths, ill-defined beyond, a small and rather obtuse tubercle each side. Elytra less than one-third wider at the base than the prothorax, gradually narrowed from the humeral callus posteriorly, striæ wide, not deeply impressed punctures large, somewhat remote, interspaces moderately convex, each with a row of transverse tubercles which, however, become obsolete on the two or three outer interspaces; underside coarsely punctured, each puncture bearing a pale scale. Length 3.3-4.0 mm.; 0.125-0.16 inch.

♂. Last ventral segment with a well defined, coarsely punctured fovea.

♀. Last ventral transversely impressed before the apical margin.

*Hab.*—Lake Superior, Michigan, Pennsylvania (Hazleton).

It is with pleasure that I dedicate this species to the memory of Dr. John LeConte.

## ACANTHOSCELIS gen. nov.

Under this generic term I have separated from its near allies that heterogenous aggregation of forms heretofore known in our lists and collections as *Cœliodes acephalus* and *curtus*. The formation of the ventral segments at once separate it from *Cœliodes*, which, indeed, it resembles very little in general habitus. Its nearest relative is *Cnemogonus*, with which it agrees in the pectoral canal not extending beyond the mesosternum and in the presence of the apical process of the anterior tibiæ, and from which it differs in habitus and the absence of the acute tooth near the base of the tibiæ.

The beak is moderately stout, nearly straight, shorter and cylindrical in the male, somewhat attenuated and shining towards the apex in the female; scrobes expanding posteriorly, antennal funicle 7-jointed. The eyes are rather large; prothorax convex, ample, constricted at the apex in all (except *pusillus*), lateral tubercles acute, small, scutel not visible. Elytra at most very little longer than wide; prosternum moderately long in front of the coxæ, pectoral canal sharply defined and extending upon the mesosternum, metasternum short; second ventral segment shorter than the two following united, prolonged at the sides, the third segment narrowly attaining the lateral margin. The legs are generally rather stout, though slender in some, femora not toothed, posterior stouter than anterior and middle, tibiæ very variable, anterior with the external apical angle produced into a toothed process, the middle and posterior with a broadly triangular or even rectangular tooth above the apex, or else subangulate or simple; tarsi variable, claws bifid.

The following analytical table of species is based on a critical ex-

amination of an unusually large number of specimens at my disposal. The species, while bearing a great deal of resemblance to each other, present, nevertheless, considerable uniformity in appearance and size, and with the aid of the figures and descriptions the student will be enabled to identify his material with certainty.

Middle and posterior tibiæ stouter, conspicuously widened toward the apex, distinctly toothed or angulated above the latter, tarsi never very slender, orbital margin elevated, front concave. Pl. xii, figs. 5, 5a.
- Front transversely grooved; scales mottled.
  - Larger, middle tibiæ feebly emarginate above the apex, apical hook of male minute. Pl. xii, fig. 5 ..... **californicus.**
  - Smaller, middle tibiæ deeply emarginate, inner angle prolonged into a strong mucro. Pl. xii, fig. 6a ..... **frontalis.**
- Front without transverse groove.
  - Posterior tibial tooth rectangular, scales predominantly grayish white, inconspicuously mottled. Pl. xii, fig. 7 ..... **griseus.**
  - Posterior tibiæ acutely angulated.
    - Tibiæ stouter, posterior without supra-apical emargination. Pl. xii, fig. 8. **ilex.**
    - Tibiæ more slender, posterior emarginate above the apex. Pl. xii, fig. 10. **curtus.**

Middle and posterior tibiæ slender, at most subangulate, never obviously widened toward the apex. Pl. xii. fig. 9a.
- Tarsi broad, stout, upper margin of eye not raised above level of front. **acephalus.**
- Tarsi slender.
  - Prothorax strongly constricted at the apex.
    - Outer joints of funicle not markedly wider.
      - Very stout, scales unicolorous grayish white, without regularly arranged spots of condensed paler scales; tarsi very slender. Pl. xii, fig. 11. **tarsalis.**
      - Less robust, above with regularly arranged spots of condensed scales. Pl. xii, figs. 3 and 4.
        - Scales pale ochreous, middle tibiæ emarginate above the apex, outer apical angle acute, elytral striæ wider and more deeply impressed. **guttatus.**
        - Scales grayish, middle tibiæ not emarginate, outer angle rounded elytral striæ finer ..... **perplexus.**
    - Outer joints of funicle much widened, scales predominantly dark brown, with spots of condensed pale scales ..... **mendicus.**
  - Prothorax not constricted at the apex. Pl. xii, fig. 4 ..... **pusillus.**

**A. californicus** n. sp. Pl. xii, figs. 5, 5a.—Oval, robust, dark piceous, legs and antennæ ferruginous, above densely scaly, scales darkish brown, mottled with pale spots, underside densely clothed with large, dirty white scales. Legs coarsely pubescent; beak rather stout, curved, coarsely punctured and pubescent, a feebly elevated median line, antennæ inserted about the middle, first joint of funicle longer than the second, this a little longer than the third, which is equal to the

fourth, joints 5-7 short, scarcely widened toward the club, latter ovoidal. Head concave between the eyes, orbital margin elevated, a curved, acutely elevated ridge between the eyes, forming the anterior margin of a wide transverse sulcus, the posterior margin of which is ill-defined; prothorax nearly twice as wide than long, broadly constricted at the apex, regularly rounded on the sides and narrowed from the base; dorsal channel wide, superficial, evanescent anteriorly, disc densely and very finely punctured except along the base, where the punctures become larger, each puncture bearing a coarse piliform scale, lateral tubercles rather acute, distinct, a spot of pale scales in front of each tubercle, another less distinct spot each side of middle and on a transverse line with the lateral spots. Elytra one-third wider at the base than the prothorax, scarcely longer than wide, narrower from the humeral callus posteriorly, striæ deep, punctured, punctures concealed by the scaly vestiture, interspaces convex, alternately wider; femora feebly clavate, tibiæ stout, widened from base to apex, posterior with a triangular tooth one-third above the apex, tarsi less stout, fourth joint about as long as the two preceding joints together; pygidium rather coarsely but not densely punctured. Length 3.75 mm.; 0.15 inch.

♂. First and second ventral segments broadly impressed at the middle and posterior tibiæ unguiculate at the apex.

*Hab.*—California, Dr. Horn and Mr. Ulke's collection.

Six specimens, all males, are before me. A specimen bearing the label "*C. curtus* in Dr. Horn's coll." has served as the type for the above description. Readily recognized by the transverse frontal sulcus in which it agrees with the next species, and from which it differs in its larger size and absence of the strong mucro of the middle tibiæ. A specimen in Mr. Ulke's coll. has the frontal sulcus almost obsolete.

**A. frontalis** n. sp. Pl. xii, figs. 6. 6*a*.—Agrees in form and scaly vestiture with the preceding species, but is smaller. The transverse frontal groove is wide and well marked; the tibiæ are more slender, middle and posterior more deeply emarginate above the apex and the inner apical angle of the former prolonged into a stout mucro. Length 2.75 mm.; 0.11 inch.

♂. Same as in *californicus*, except the difference in apical armature of middle tibiæ.

*Hab.?* (probably California)

A male specimen without locality label in Dr. Horn's coll. I am not at all certain that the characters adduced in differentiating this from the preceding species, are constant; more extensive series of specimens are required to settle this point.

**A. griseus** n. sp. Pl. xii, fig 7.—Robust, oval, black, clothed with ashy gray scales, which are larger and more dense on the underside, smaller and less crowded above, especially on the elytra. Beak rather long and stout, subcarinate, slightly tapering and sparsely scaly from the middle, basal half densely scaly; antennæ slender, inserted two-fifths from the apex (♂), first joint of funicle scarcely longer than the second, a little stouter, joints 3-4 equal, a little longer than the outer

joints, which are widened toward the clava, the latter short, ovoidal. Head densely scaly, channeled between the eyes; prothorax one-half wider than long, rounded on the sides, broadly constricted at the apex, lateral tubercles small, acute, dorsal channel extending from base to about the middle, disc densely punctured, a spot of pale scales in front of lateral tubercles. Elytra less than one-third wider at the base than the prothorax and a little longer than wide, striæ impressed, punctures not distinct, interspaces flattened, an ill-defined spot of condensed scales near the base and at the end of the third interspace and two-fifths from the base on the fifth and ninth interspaces; tibiæ widened from the base to the apex, posterior pair with a large rectangular tooth one-third above the apex, tarsi rather slender, fourth joint as long as the two preceding joints together; pygidium densely punctured. Length 3.5 mm.; 0.14 inch.

♂. Last ventral segment with a broad, feebly impressed fovea; middle and posterior tibiæ not unguiculate at tip.

*Hab.*—Montana.

Three females in Dr. Horn's coll. Distinguished from all others by the large rectangular tooth of the hind tibiæ.

**A. ilex** n. sp. Pl. xii, fig. 8.—Agrees with the preceding species in size and form; upper surface more densely scaly, scales pale brown and grayish white in about equal proportion; underside as in *griseus;* beak densely punctured, subcarinate, pubescent, orbital margin acutely elevated, front broadly concave; prothorax as in *griseus*, narrowly and not very strongly constricted at the apex. Elytral striæ less impressed and with the punctures more or less concealed by the scaly vestiture, interspaces flattened, anterior three-fifths with the exception of the sutural interspace more conspicuously mottled, latter and apical two-fifths more uniformly pale gray; posterior tibiæ conspicuously widened toward the apex, forming a large triangular tooth, the distal margin of which forms an almost straight line to the apex. Length 3.5 mm.; 0.14 inch.

♂. Last ventral segment feebly impressed; middle and posterior tibiæ not unguiculate at the apex.

*Hab.*—Montana.

A male specimen in my coll. The form of the posterior tibiæ readily distinguished in this species. Its nearest ally is *griseus*, from which, aside of tibial structure, it differs by the broadly concave front, acutely elevated orbital margin, the narrow and less sharply defined apical constriction of the prothorax and sexual differences in the male.

**A. curtus** Gyll. Pl. xii, fig. 10.—Broadly oval, dark piceous, antennæ and legs reddish brown, rather densely clothed with very small, brown and pale cinereous or ochreous scales, underside densely clothed with oval, ashy-gray or pale yellowish scales. Beak stout, somewhat flattened above, densely scaly and scarcely tapering toward the apex in the male, cylindrical, strongly tapering and shining beyond the antennal insertion in the female; antennæ inserted two-fifths from the apex (♂), or at the middle (♀), stout, first joint of funicle robust, scarcely longer than the second joint, joints 3 7 short, widened outwardly, orbital margin elevated, front moderately concave between the eyes; prothorax convex, less than

one-half wider than long, broadly rounded on the sides, apex widely but less strongly constricted, tubercles acute, dorsal channel entire, narrowed and more superficial anteriorly, disc densely punctured and scaly, scales elongate, piliform, four spots of pale scales in a transverse line immediately in front of the lateral tubercles, another row of three spots behind the apical margin. Elytra two-fifths wider at the base than the prothorax at its base, scarcely wider than long, rather strongly narrowed posteriorly, striæ impressed with a row of scales concealing more or less the rather large punctures, interspaces convex, alternately wider and a little more convex, surface mottled in nearly equal proportion with pale and dark scales. Legs rather stout, densely clothed with scale-like pubescence, tibiæ widened from the base towards the apex, middle and posterior with a broad triangular tooth, acutely emarginate above the apex, tarsi moderately stout, the fourth joint scarcely longer than the two preceding two joints together, third not very broadly bilobed; pygidium coarsely and not very densely punctured Length 3.0-3.5 mm.; 0.12-0.14 inch.

♂. Fifth ventral segment feebly impressed, middle and posterior tibiæ ungu iculate at the apex.

*Hab.*—District of Columbia, Maryland, Illinois, Kentucky, Arizona, Montana.

Numerous specimens are before me. Differs somewhat in size and appearance according to the preponderating color of the scales. A specimen in my coll. from Montana has the interspaces more flattened and less unequal; punctures more distinct. Gyllenhall's description* applies rather to *acephalus* than to the present species.

**A. acephalus** Say. Pl. xii, figs. 9, 9*a* and 9*b*.—Broadly oval, blackish, legs rufopiceous, above clothed with pale, ashy-gray or yellowish scales, unicolorous or mottled in varying proportions with dark brown; scales coarse piliform on the prothorax, smaller and oval, or elongate oval on the elytra, underside densely clothed with large, oval, ashy-gray scales. Beak rather long, stout, cylindrical, and entirely scaly in the male, more slender, conspicuously tapering and shining in its apical half; in the female, antennæ inserted at the middle (♂), or two-fifths from the base (♀), first and second joints of funicle elongate, joints three and four equal, not longer than wide, joints 5–7 short, gradually wider, club ovoidal, subacuminate; upper margin of eye not elevated above the level of the front, the latter flattened or longitudinally impressed; prothorax convex, more than one-half wider than long, about twice as wide at the base than at the apex, hind angles rectangular, sides regularly rounded, strongly, but not broadly constricted at the apex, dorsal sulcus distinct, more deeply impressed at the base, nearly obsolete in front, lateral tubercles small, inconspicuous, a fovea-like impression in front of each tubercle; surface densely punctured, punctures moderately large. Elytra about one-fifth wider at the base than the prothorax, scarcely as long as wide and markedly narrowed posteriorly, striæ wide, impressed, especially at the base, punctures not very evident, small; interspaces equal, flattened; pygidium convex, coarsely punctured. Legs moderately stout, tibiæ gradually widened toward the apex, middle tibiæ emarginate above the apex, posterior subangulate, not emarginate; tarsi stout, joints two and three

* Schoenb. Curcul. vol. iv, p. 289.

rather short, fourth not longer than the two preceding joints together. Length 3.0-3.75 mm.; 0.12-0.15 inch.

♂. Ventral segments 2-5 broadly impressed and clothed with long, grayish or fulvous pubescence, middle and posterior tibiæ unguiculate at the apex.

*Hab.*—Eastern, Middle and Western States.

A careful comparison with Say's description, supplemented by those of Germar* and Bohemann,† leaves no doubt in my mind that this is Say's species. It varies considerably in size, Say's statement —"length more than one-tenth inch"—is too indefinite. The size as given by Germar—"magnitudive *Cœliodis guttulæ*" agrees, although the foot-note, "mihi invisa" makes it difficult to discover the source of his information unless based on Say's original description. *C. subulirostris* Sch. applies to the female; it does not differ otherwise.

This species may readily be distinguished from all the preceding species by the posterior tibiæ being simply subangulate and rather slender; from all the following by the much stouter tarsi and on the whole larger size. The impressed abdomen of the male with its long pubescence occurs in other species.

A form occurring in Utah and Colorado differs considerably from the typical.

Var. *tenebrosus*.—Dorsal channel of the prothorax reduced to a well defined and deeply impressed basal fovea, prothorax more strongly convex and very densely and finely punctured, the scaly vestiture is much finer and more sparse, scarcely at all mottled, giving the whole insect a much darker appearance. This may possibly be *C. leprosus* Boh., the descriptive phrase "thorace non canaliculata" being applicable to the variety under consideration, but the impression at the base of the prothorax is superficial. I have not been able to identify this species with any specimen before me. A specimen in the National Museum collection bears the cabinet label, "*C. leprosus*," but the prothorax is distinctly canaliculate, the scaly vestiture a dirty ochreous. Why Bohemann should refer this species to Say as its author is difficult to understand, as I have been unable to discover any species described under that name in Say's writings.

**A. tarsalis** n. sp. Pl. xii, fig. 11.—Broadly oval, black, antennæ and legs rufopiceous, clothed with grayish white scales, larger and very dense on the underside, smaller and less crowded above. Beak rather slender, subcarinate, densely punctured and scaly in its basal half, tapering, more finely punctured

* Schoenh., gen. et spec. Curcul. vol. iv, 1, p. 289.

† Ibid. vol. viii, 1, p. 394.

and shining toward the apex, antennæ moderately stout, inserted just before* the middle, first joint of funicle stout, following joints of about equal thickness, 2–4 a little longer than the outer joints, which are not widened, club ovoidal. Head convex, punctured and scaly, orbital margin not elevated, front not concave; prothorax convex, less than one-half wider than long, regularly rounded on the sides, sharply though not broadly constricted at the apex, dorsal channel deeply impressed in its basal fourth, indistinct beyond, lateral tubercles inconspicuous, small, a superficial fovea-like impression with condensed white scales in front of each, surface densely and finely punctured, each puncture bearing an elongate scale. Elytra nearly one-third wider at the base than the prothorax, a little wider than long, feebly rounded on the sides and narrowed from the humeral callus posteriorly, striæ impressed, punctured, not concealed by the scales, interspaces somewhat convex, equal, rugose, scales not condensed into spots; pygidium densely punctured; tibiæ nearly parallel, middle and posterior tibiæ feebly emarginate above the apex, outer angle produced, tarsi very slender, fourth joint conspicuously longer than the two preceding joints. Length 3.5 mm.; 0.14 inch.

♂. Last ventral segment slightly foveate near the tip; middle and posterior tibiæ unguiculate at the apex.

*Hab.*—Texas. A male specimen in Dr. Horn's coll. bearing the cabinet label, "*C. acephalus* Say," from which it differs by the "very slender tarsi and elongate fourth joint and the more convex elytral interstices. It is much more robust than any of the following species, from which it also differs in the absence of all elytral spots.

**A. guttatus** n. sp. Pl. xii, fig. 3.—Oblong oval, piceous, antennæ and legs rufo-testaceous, densely clothed above with small, pale straw-colored scales, variegated on the elytra with spots of paler scales, underside densely clothed with large, cream-colored scales. Beak rather slender, cylindrical and scaly nearly to the tip in the male, attenuated and shining beyond the insertion of the antennæ in the female; antennæ slender, inserted at the middle (♂), or two-fifths from the base (♀), first and second joints of funicle distinctly elongate, joints 3 and 4 about equal, outer joints a little wider, club stout, ovoidal; prothorax wider than long, rounded on the sides, narrowly constricted at the apex: surface closely but not very finely punctured, dorsal channel well impressed posteriorly, nearly obsolete in front, lateral tubercles very small, a transverse row of four spots and base of dorsal sulcus clothed with pale scales. Elytra less than one-third wider at the base than the prothorax and a little longer than wide, narrowed posteriorly, striæ well impressed, wide, not concealed by the scales, distinctly punctured, punctures small, each bearing a white oval scale, interspaces flattened, about equal in width, the pale spots are arranged as follows: one near the base and another at the apex of the third insterspace, another spot on the fifth and ninth interspaces, two-fifths from the base; pygidium closely punctured and scaly. Legs densely scaly; tibiæ slender, middle emarginate above the apex, outer apical angle acute, posterior tibiæ distinctly angulate, tarsi long and slender, third joint not broadly bilobed, fourth longer than the two preceding joints together, tooth very slender. Length 3.25–3.5 mm.; 0.13–0.14 inch.

* To avoid misunderstanding, the expression "inserted before the middle" means "nearer the base," beyond the middle "nearer the apex."

**AULEUTES** gen. nov.

This genus is distinguished from *Celiodes* by the formation of the ventral segments. The beak is rather stout, feebly curved and cylindrical. Eyes moderately convex, rarely (*epilobii*) more prominent, with elevated orbital margin, partly or entirely concealed in repose according to the development of the prothoracic lobes; prothorax evenly convex, lateral tubercles distinct; scutel distinct in some, not visible in others. Elytra somewhat suddenly wider at the base than the prothorax, striato-punctate; pectoral canal deeply excavate, sharply limited laterally, extending upon the metasternum, more rarely to the mesosternum only; middle coxæ more widely separated than the anterior and never very closely approximate to the latter; second ventral segment shorter than the two following united, the third narrowed at the sides, not or narrowly attaining the lateral margin. Legs generally slender, middle and posterior tibiæ emarginate above the apex; tarsi variable.

The species are dark colored insects, thinly clothed with a fine squamiform pubescence. I have divided them according to the formation of the metasternum into two groups, as follows:

Metasternum distinctly excavate and emarginate, forming the posterior limit of the pectoral sulcus. Elytra evidently roughened (except *epilobii*). Pl. xii, fig. 14 ..... **Group I.**

Metasternum not, or very feebly emarginate, not entering into the formations of the pectoral canal. Elytra not asperate. Pl. xii, fig. 14*a* ..... **Group II.**

**Group I.**

Contains the larger number of species, which, while exhibiting considerable differences in structure, agree in having the metasternum emarginate and more or less excavate. The elytra are roughened in nearly all by tubercles, or small, acute granules.

The species are distinguished as follows:

Anterior and middle tibiæ not subangulate near the base, eyes not prominent, front not concave.

Larger species, claws armed with a long, slender tooth, almost bifid, prothoracic lobes feeble, eyes only partially concealed in repose.

Funicle 7-jointed.

Alternate elytral interstices wider and more conspicuously tuberculate.

Larger, prothorax less coarsely punctured, anterior tibiæ curved, slender, elytral tubercles small. Pl. xii, fig. 15 ..... **curvipes.**

Smaller, prothorax coarsely punctured, anterior tibiæ straight, elytral tubercles large, distinct. Pl. xii, 15*a* ..... **asper.**

Interspaces equal, or nearly so; prothorax coarsely punctured.

Stouter, prothorax distinctly wider than long, elytral asperities more obvious ..... **tenuipes.**

Less robust, prothorax very little wider than long ..... **ater.**

Funicle 6-jointed ..... **tuberculatus.**

Smaller species, claws arranged with a short tooth, postocular lobes prominent, eyes concealed in repose.

Black, cruciform scutellar spot and lateral fascia white. Pl. xii, fig. 12. **subfasciatus.**

Dark brown, sutural spot and scattered, erect scales, white. Pl. xii, fig. 13. **tachygonoides.**

Anterior and middle tibiæ subangulate near the base. Pl. xii, figs. 15*b* and 15*c*.

Larger, head convex, without elevated orbital margin, elytral interspaces roughened with small tubercles ..... **longirostris.**

Smaller, front concave between the eyes, latter with elevated ridges, elytra without evident asperities, a cruciform scutellar spot of white scales. **epilobii.**

**A. curvipes** n. sp. Pl. xii, fig. 15.—Broadly oval, black, antennæ and legs dark rufous; above thinly clothed with whitish pubescence, a large scutellar spot and some scattered ill-defined spots of condensed, larger scales, underside clothed with larger scales. Beak stout, rather short, slightly curved, finely subcarinate in almost its entire length, striate each side towards the base, the latter squamous, coarsely punctured, glabrous at the apex, scrobes suboblique, antennæ slender, inserted at the middle, scape directed against the lower angle of the eye, funicle 7-jointed, joints 1–4 elongate, outer joints short, club oval. Eyes not prominent, only partially concealed in repose. Head coarsely punctured, front slightly concave between the eyes, the latter without elevated ridges; prothorax one-half wider than long, less than one-third wider at the base than at the apex, narrowed from the basal third to the apical constriction, the latter broad, conspicuous, lateral tubercles large, prominent, dorsal sulcus almost entire, but distinct, at the base only, surface evenly, densely and rather coarsely punctured, each puncture bearing a fine short hair, a few pale condensed scales in front of the scutel, which is very small. Elytra one-fourth wider at the base than the prothorax, regularly rounded on the sides and narrowed to the apex, striæ impressed, closely punctured, interspaces somewhat convex, alternately a little wider, each with a row of very small, but acute granules, more evident on the wider interspaces and on the declivity, each bearing a short procumbent seta; pygidium not coarsely punctured with a longitudinal, feebly impressed sulcus; underside very coarsely punctured, anterior tibiæ long and curved, middle and posterior tibiæ with a triangular tooth and emargination above the apex, tarsi very slender, first joint much longer than the second, third broadly bilobed, fourth shorter than the two preceding joints together, claws with a long, slender tooth. Length 3.0 mm.; 0.12 inch.

♂. Abdomen flattened along the middle, fifth segment with broad semicircular fovea, middle and posterior tibiæ unguiculate at the tip.

*Hab.*—Texas.

A male specimen in Dr. Horn's coll.; it bears the cabinet label, "*C. tenuipes* Lec.," from which it differs by its much smaller elytral tubercles, greater size, curved anterior tibiæ and much more slender tarsi; the anterior tibiæ have a very small apical hook.

**A. asper** Lec. Pl. xii, fig. 15*a*.—Broadly oval, robust, black with some lustre, antennæ and legs scarcely paler, thinly pubescent above, conspicuously mottled on the elytra with whitish scales. Beak stout, rather short, cylindrical, slightly curved, carinate, striate each side, punctured and pubescent, glabrous at the apex, scrobes suboblique; antennæ not very slender, inserted about the middle, funicle 7-jointed, joints 1-2 stouter and longer, following joints shorter, club ovoidal, acuminate. Head densely and rather coarsely punctured, somewhat concave between the eyes, these only partially covered in repose and without elevated orbital ridges; prothorax a trifle wider than long and about two-fifths wider at the base than at the apex, feebly rounded on the sides, broadly but not distinctly constricted at the apex, postocular lobes nearly obsolete, lateral tubercles acute, distinct, dorsal channel narrow, ill-defined, except at the base, surface densely but not coarsely punctured and thinly pubescent, a median line and four ill-defined spots arranged in a transverse line, of whitish scales; scutel minute, scarcely visible. Elytra nearly one-third wider at the base than the prothorax, about as long as wide, rounded on the sides from the humeral callus to the apex, deeply striate, striæ closely and rather coarsely punctured, interspaces convex, alternately wider, each with a row of large, acute and somewhat remote tubercles, those of the broader interspaces larger and more numerous, partially obsolete on the narrower interspaces, each bearing a bristle-like hair on its summit, a transverse scutellar spot, sutural interspace and less defined spots and lines of white scales; pygidium densely but not coarsely punctured with a longitudinal, ridge-like elevation; underside rather coarsely punctured; tibiæ nearly straight, subparallel, outer angle of anterior pair acutely produced, middle and posterior feebly emarginate above the apex, tarsi moderately slender, third joint less broadly bilobed, fourth as long as the two preceding joints together, claws armed with a long slender tooth, nearly as long as the claw itself. Length 2.0-2.5 mm.; 0.08-0.10 inch.

♂. Last ventral segment with a small ill-defined fovea, middle and posterior tibiæ unguiculate at the apex.

*Hab.*—Canada, Iowa, Kansas, Colorado, Montana, Missouri.

Numerous specimens are before me. The obviously tuberculate and mottled elytra make this species readily recognizable. The only species to which the present bears a close resemblance in the tuberculate elytra, is *tuberculatus*, from which it differs in the 7-jointed funicle. The produced outer angle of the anterior tibiæ bears no resemblance to the process of *Acanthoscelis*. A specimen in the Nat. Museum coll. bears the label "an *Epilobium*."

**A. tenuipes** Lec. Pl. xii, fig 14.—Oval, entirely pitchy black above, very thinly clothed with fine, pale pubescence, interspersed with white scales, underside more densely scaly. Beak rather long and stout, slightly curved, cylindrical and punctured throughout in the male, slightly tapering and shining toward the apex in the female, a distinct median elevated line and more obscure lateral one each side; scrobes parallel, antennæ not slender, inserted a trifle before (♀), or beyond (♂) the middle, funicle 7-jointed, joints 1-2 elongate, stout, outer joints shorter; eyes scarcely convex, without elevated ridges, only partially concealed in repose. Head densely punctured, front flattened; prothorax scarcely wider

than long, one-third wider at the base than at the apex, sides broadly rounded, apical constriction wide and distinct, apical margin feebly emarginate at the middle, indistinctly bicuspid; lateral tubercles quite distinct, acute, dorsal channel irregular, well impressed in its basal third, obsolete anteriorly, a transverse impression in front of each lateral tubercle, surface very coarsely punctured, especially towards the base, punctures more crowded on the sides in front and on the apical constriction; scutel punctiform. Elytra nearly one-fourth wider at the base than the prothorax, not longer than wide, feebly rounded on the sides and conspicuously narrowed towards the apex, striæ very wide, coarsely and closely punctured, interspaces convex, nearly equally wide, each with a row of small, but acute granules, which are larger and more closely placed near the base than on the disc, each bearing a short, seta-like hair, a cruciform scutellar spot of whitish scales, the arms of which are somewhat oblique, another oblique, more or less interrupted spot of similar scales, about two-fifths from the base and extending from the seventh to the ninth interspaces, some ill-defined transverse lines on the disc; pygidium coarsely but not closely punctured, longitudinally grooved (♂) or convex (♀); underside not closely punctured, punctures large; pectoral canal extending upon the metasternum. Legs long and slender, tibiæ straight, slightly curved near the base, middle and posterior broadly emarginate above the apex, tarsi slender, fourth joint shorter than the two preceding joints together, claws armed with a long tooth. Length 2.5–3.0 mm.; 0.10–0.12 inch.

♂. Last ventral segment broadly impressed, middle and posterior tibiæ unguiculate at the apex.

*Hab.*—Texas, Missouri, Georgia.

Closely related to the next species, from which it differs by its more robust form and the elytral interspaces with a row of distinct tubercles. From *longirostris*, to which also it bears considerable resemblance, it differs by the stouter and less elongate beak, and by the tibiæ not subangulate near the base. In some specimens the elytral markings are quite effaced, in a few others the oblique lateral spot of the elytra is interruptedly connected with the cruciform scutellar spot, forming thus an angulated band similar to that seen in *Ceut. angulatus* and its allies.

**A. ater** n. sp.—Very similar to the preceding species, from which it differs as follows: subrhomboidal, more strongly narrowed posteriorly. Beak a little shorter; prothorax distinctly wider than long, more rounded on the sides, dorsal channel quite obvious, entire. Elytral interspaces not distinctly tuberculate, but with rows of close set, very minute, acute asperities, scutellar spot not cruciform, confined to the sutural interspace. Length 3.0 mm.; 0.12 inch.

♂ as in *tenuipes*.

*Hab.*—Hazleton, Pa.; Connecticut.

Five specimens in my coll. not differing in size. Agrees with *longirostris* in the elytral asperities and entire dorsal channel of the prothorax, but is at once distinguished by the much stouter and shorter beak of the female and the anterior and middle tibiæ not being subangulate near the base.

**A. tuberculatus** n. sp.—Rhomboidal, robust, black, antennæ and legs piceous, upper surface very sparsely and finely pubescent, pubescence intermixed with large pale scales, underside clothed with dirt-colored scales. Beak stout, not quite as long as the prothorax, slightly widened towards the apex, distinctly carinate, finely striate each side, punctured; antennæ slender, funicle 6-jointed, first joint stout, elongate, joints 2-3 shorter and more slender, three outer joints widened towards the clava, latter elliptic, acuminate; eyes only partially concealed in repose. Head convex, finely and sub-confluently punctured; prothorax one-half wider than long, rounded on the sides, broadly constricted at the apex, anterior margin entire, subangulate each side, lateral tubercles distinct, acute, dorsal channel evident from base to apical constriction; disc closely and not very coarsely punctured; scutel not visible. Elytra little more than one-fourth wider at the base than the prothorax, scarcely rounded on the sides and very distinctly narrowed posteriorly, striæ feebly impressed, punctures not distinct, interspaces a little convex, about equal in width, each with a row of large conical tubercles interrupted by a transverse belt before the declivity, tubercles without setæ, spaces between the tubercles rugulose; pygidium and under surfrce not coarsely punctured. Legs long, tibiæ very slender, middle and posterior not emarginate above the apex, tarsi slender, third joint not very broadly bilobed, fourth shorter than the two preceding joints combined, claws armed with a long slender tooth. Length 2.5 mm.; 0.10 inch.

*Hab.*—Arizona.

A female specimen in Dr. Horn's coll. The occurrence of a species with 6-jointed antennal funicle in the subtribe *Cœliodes* is rather anomalous. Its nearest ally is *asper*, which it resembles in its prominent and conspicuous elytral tubercles, and from which it differs aside from the 6-jointed funicle by its broader form, equal elytral interspaces, the tubercles not setiferous, and the simple middle and posterior tibiæ.

**A. subfasciatus** n. sp. Pl. xii, fig. 12.—Broadly oval, pitchy black, legs piceous, tarsi paler; very thinly clothed with a very fine and short pubescence, elytra with patterns of large white scales. Beak elongate, stout, about as long as the prothorax, slightly widened towards the apex, coarsely sculptured, substriate, striæ irregular, with intervening elevated lines, glabrous in its apical third. Eyes concealed in repose. Head convex, coarsely punctured; prothorax more than one-half wider than long, about one-fourth wider at the base than at the apex, rounded on the sides, broadly and not strongly constricted at the apex, postocular lobes strongly developed, apical margin with two minute, rather distinct cusps, lateral tubercles distinct, dorsal channel ill-defined; surface very coarsely punctured; scutel not evident. Elytra one-third wider at the base than the prothorax, not longer than wide, humeri very prominent, rounded on the sides from the humeral prominence to the apex, striæ deep, not wide, punctures rather small, interspaces convex, each with a row of very small, acute granules, each bearing a conspicuous, short hair, a cruciform spot of white scales, the transverse bar about one-third from the base and narrowly separated from an interrupted, lateral fascia a little before the middle; pygidium with large, not close set punctures, more strongly convex in the female; pectoral canal extending upon the

metasternum: underside coarsely punctured. Legs slender, tibiæ subparallel, middle and posterior scarcely emarginate above the apex, tarsi slender, third broadly bilobed, fourth shorter than the two preceding joints combined, claws with a short, median tooth. Length 1.75–2.0 mm.; 0.08 inch.

♂. Last ventral segment with a small, rounded and deeply impressed fovea.

*Hab.*—Maryland; Detroit, Mich.

A male and female specimen are before me, one in the Nat. Mus. coll., the other in my own. A very distinct species, easily recognized by its robust form, small size, long and stout beak, prominent ocular lobes, elytral ornamentation and short clawal tooth. I regret that I have not been able to expose the antennæ for examination without great risk of destroying the specimen; for the same reason I have been unable to examine the tibiæ of the male.

**A. tachygonoides** n. sp. Pl. xii, fig. 13.—Broadly oval, dark, piceous, antennæ and legs rufo-piceous, above sparsely clothed with fine pubescence, interspersed with large, white, erect scales on the elytra; underside sparsely scaly. Beak stout, shorter than the prothorax, a little widened toward the apex in the male, very finely striate and punctured, scrobes expanded posteriorly, antennæ inserted at the middle (♂), rather slender, funicle 7-jointed, joints 1–4 a little elongated, 5–7 short, club oval, subacuminate. Eyes concealed in repose, posterior margin elevated, free. Head convex, finely and not very closely punctured; prothorax as in *subfasciatus*, punctures a trifle smaller: scutel very small. Elytra less than one-third wider at the base than the prothorax, a little wider than long, rounded on the sides to the apex, striæ deep, closely punctured, interspaces convex, very rugose, each with a row of very small, acute granules, each bearing a short hair on its summit, a conspicuous white line on the sutural interspace extending about one-third its length; pygidium neither coarsely nor densely punctured, subcarinate in the female, simply convex in the male: pectoral groove extending upon the metasternum; underside not coarsely punctured, punctures rather superficial, somewhat distant on the sternal side-pieces, arranged in rows on the ventral segments. Legs, tarsi and claws as in the preceding species. Length 1.75–2.0 mm.: 0.07–0.08 inch.

♂. Last ventral segment not impressed, middle and posterior tibiæ not unguiculate at the apex.

*Hab.*—District of Columbia (Ulke), Texas (Nat. Mus. coll.).

One male and two females are before me, similar to but quite distinct from *subfasciatus*, from which it is distinguished by its much shorter beak, different elytral ornamentation and the presence of scattered, erect scales on the elytra.

**A. longirostris** n. sp. Pl. xii, fig. 15*b*.—Robust, oval, entirely pitchy black, above very sparingly clothed with a very short, fine pubescence, underside very coarsely punctured with few scattered scales, legs more densely pubescent. Beak slender, longer than the prothorax (♀), curved, indistinctly subcarinate about the middle third, striolato-punctate, scrobes subparallel, directed against the eyes, antennæ slender, inserted two-fifths from the base (♀), funicle 7-jointed

joints 1–2 elongate, 3–4 short, equal, outer joints scarcely wider. Eyes flattened, not concealed in repose, orbits margined. Head densely punctured, more coarsely on the front; prothorax fully one-half wider than long, less than one-third wider at the base than at the apex, rounded on the sides, broadly and distinctly constricted at the apex, anterior margin slightly emarginate, postocular lobes very feeble, lateral tubercles acute, prominent, dorsal channel entire, less obvious on the disc, foveiform anteriorly, surface rather densely and not coarsely punctured; scutel not visible. Elytra about one-fourth wider at the base than the prothorax, feebly rounded on the sides, distinctly narrowed toward the apex, deeply striato-punctate, punctures close set, interspaces convex, equal, rugose, each with a row of small, acute granules, scutellar region depressed with an indistinct spot of pale scales; pectoral canal extending upon the metasternum; pygidium coarsely punctured, carinate in its apical half. Legs long, anterior and middle tibiæ parallel, subangulate near the base, middle feebly emarginate above the apex, posterior curved, acutely angulated and deeply emarginate above the apex, tarsi slender, fourth joint shorter than the two preceding joints together. Length 2.75 mm.; 0.11 inch.

*Hab.*—Texas.

A female specimen in the Nat. Mus. coll.; it is almost entirely deprived of scales, hence the above description may not be fully applicable in this respect to better preserved specimens. It is, however, readily distinguished from all other species except the next, by its very long and slender beak, and the angulate tibiæ; from *epilobii* it differs by its greater size, still more slender beak of the female, the anterior margin of the prothorax feebly emarginate on the sides and at the middle, the very convex head, scarcely prominent eyes, without elevated orbital margin, deep elytral striæ and distinct rows of acute granules on the elytral interstices.

**A. epilobii** Payk. Pl. xii. fig. 15c.—Oval, dark piceous, antennæ and tarsi rufous, above irregularly mottled with small white scales, underside not densely scaly. Beak as long as the prothorax, rather slender, curved, cylindrical, bistriate and punctured, entirely scaly (♂) or subglabrous toward the apex (♀). Eyes prominent, with acutely elevated orbital margin, not entirely concealed in repose. Head moderately convex, densely punctured, front concave between eyes; prothorax one-half wider than long, rounded on the sides, broadly and distinctly constricted at the apex, anterior margin elevated and narrowly emarginate, lateral tubercles distinct, acute, dorsal channel entire, not very distinct, surface closely and not coarsely punctured, inconspicuously mottled with pale scales; scutel punctiform. Elytra less than one-third wider at the base than the prothorax, longer than wide, sides nearly straight, obviously narrowed posteriorly, striæ less deeply impressed, punctures small, closely approximate, interspaces convex, alternately a little wider, rugulose, without distinct granules, a very conspicuous, cruciform scutellar spot of white scales, a series of three spots of similar scales and arranged in a curved line before the middle on the fifth, seventh and ninth interspaces; the remaining surface indistinctly mottled; pygidium convex, more finely and less densely punctured in the male, longitudinally impressed

and coarsely punctured in the female; pectoral sulcus extending upon the metasternum; underside with the exception of the first two ventral segments rather densely punctured; tibiæ flattened, anterior and middle subangulate, posterior rounded near the base, middle and posterior emarginate above the apex, tarsi stout, densely pilose, underneath with fulvous scales, third joint broadly bilobed, fourth short, scarcely longer than the third, claws with a rather short tooth. Length 2.25-2.5 mm.; 0.09-0.10 inch.

*Hab.*—Canada, Pennsylvania, Utah (Texas; Lake Sup., Lec.).

Described by LeConte as *C. cruralis.* Agrees in all particulars with well authenticated specimens from various localities in Europe in my collections. This species has the third ventral segment less narrowed at the sides than in any other. The fifth ventral segment has a fovea-like impression in both sexes. A specimen in my collection has the cruciform scutellar spot replaced by a simple basal spot as in *Rhinoncus;* it does not differ otherwise. The lateral spots on the elytra are obsolete in some specimens.

### Group II.

The few species constituting this group do not differ in general habitus from those of the first. The metasternum is not excavate for the reception of the apex of the beak; the elytra are without obvious asperities.

But two species belong here, which are distinguished as follows:

Larger, metasternum with an acute, transverse ridge, scales unicolorous, white. **nasalis.**

Smaller, metasternum flattened, scales brownish, mottled with white. **nebulosus.**

**A. nasalis** Lec.—Oval, black, antennæ and legs piceous, scaly vestiture sparse, scales on upper surface very small, hair-like, intermixed with larger, oval scales. Beak not quite as long as the prothorax (♀), curved, slightly subangulate above, flattened, tricarinate and punctured in its basal half, tapering and glabrous toward the apex, scrobes expanded posteriorly, forming somewhat of a sulcus before the upper part of the eye; antennæ slender, inserted at the middle, funicle 7-jointed, joints 1-4 elongate, first joint robust, second joint longer than the others, outer joints scarcely wider, club oval-elliptic, acuminate. Eyes slightly convex, only partially covered in repose, without superciliary ridges. Head densely punctured, front flattened; prothorax one-half wider than long, rounded on the sides, distinctly constricted at the apex, ocular lobes almost obsolete, anterior margin not emarginate, lateral tubercles acute, a spot of condensed scales in front of each, dorsal channel wide, deeply impressed at the base, narrowed and becoming evanescent in front, disc closely and coarsely punctured, especially towards the base; scutel distinct, elytra one-third wider at the base than the prothorax, longer than wide, feebly rounded on the sides and distinctly narrowed toward the apex, striæ deep, as wide as the interspaces, punctures distinct, rather large and not closely placed, interspaces convex, transversely rugose,

with a few, very minute granules towards the apex, a broad and conspicuous sutural line, about one-third the length, of white scales; pygidium finely and subconfluently punctured; pectoral canal deep, scarcely wider between the middle coxæ and not extending upon the metasternum, the latter with an acute transverse ridge. Legs rather stout, anterior and middle tibiæ subparallel, the latter distinctly emarginate and subdentate above the apex, posterior a little widened toward the apex with a triangular tooth and acute emargination above the apex, tarsi slender, third joint broadly bilobed, fourth joint shorter than the two preceding joints combined, claws with a slender tooth, scarcely two-thirds the length of the claw. Length 3.0-3.25 mm.; 0.12-0.13 inch.

♀. Third and fourth ventral segments glabrous at the middle, fifth foveate before the apex.

Three specimens, all females, Dr. Horn's, Mr. Ulke's and Nat. Mus. coll. are before me. In two specimens there is a spot of condensed scales on the third interspace near the base, giving thereby somewhat the appearance of a cruciform spot. The formation of the metasternum distinguishes this species from all others of the genus under consideration. Dr. LeConte decribes the elytral interspaces as flat; they are, however, convex.

**A. nebulosus** Lec. Pl. xii, fig. 14*a*.—Oval, dark piceous, antennæ testaceous, above thinly clothed with very fine, brownish, hair-like scales, with a brassy or cupreous lustre and mottled with spots of larger, whitish scales, underside finely and closely punctured, each puncture bearing a small, oval scale. Beak longer than the prothorax, rather stout, curved, finely striato-punctate throughout in the male, more slender, less densely punctured and glabrous toward the apex in the female, scrobes directed against the eye, antennæ slender, inserted at the middle (♂), or two-fifths from the base (♀), funicle 7-jointed, joints 1-4 elongate, first joint stout, outer joints transverse, club ovate, acuminate. Eyes moderately convex, almost entirely concealed in repose, with elevated orbital margin. Head densely and finely punctured, front slightly concave; prothorax more than one-half wider than long, two-fifths wider at the base than at the apex, rounded on the sides, broadly but not distinctly constricted at the apex, ocular lobes more distinct, anterior margin emarginate at the middle with an acute cusp each side, lateral tubercles acute, dorsal sulcus nearly obsolete, surface densely and rather finely punctured; scutel small, distinct. Elytra two-fifths wider at the base than the prothorax, wider than long, feebly rounded on the sides and obviously narrowed toward the apex, striæ not impressed, narrow, closely punctured, interstices much wider than the striæ, flattened or slightly convex, rugose, with a few distant, acute granules on the apical half, a transverse postscutellar spot, a curved lateral fascia and some irregular spots on the posterior half of the elytra, of white scales; metasternum subtruncate, not excavate. Legs slender, anterior tibiæ slender, parallel, middle and posterior a trifle wider toward the apex, scarcely emarginate, tarsi slender, third joint broadly bilobed, fourth shorter than the two preceding joints together, claws with a slender tooth one-half their length. Length 2.0-2.25 mm.; 0.08-0.09 inch.

Ventral segments semi-glabrous along the middle, fifth ventral segment of male with a large, transversely oval fovea, female with a small, round, well defined impression, middle and posterior tibiæ of male unguiculate at the apex.

*Hab.*—Canada, Pennsylvania, Georgia, Oregon and Washington.

Easily recognized by the form of the metasternum and its small size. The mottling of the elytra is frequently indistinct; when well marked this species more nearly resembles *subfasciatus*, but differs abundantly by its much finer sculpture and almost entire absence of elytral asperities.

**PELENOSOMUS** gen. nov.

A peculiar species, unlike any other of the present subtribe known to me, forms the type of this genus. It very much resembles certain forms of *Pelenomus*, from which, however, it differs by the elongate beak, the pectoral canal extended upon the mesosternum and the toothed claws. Beak elongate, somewhat stout, scrobes expanded posteriorly, directed against the eyes, antennal funicle 7-jointed; prothorax wider than long, surface very unequal, broadly and sharply depressed on the sides and in front, excavate between the prominent and acute lateral tubercles and the lateral margin; scutel minute, glabrous. Elytra suddenly and much wider at the base than the prothorax, not longer than wide, with tufts and crests of erect scales; pectoral canal deep, wider between the middle coxæ and extending upon the mesosternum, mesosternal side-pieces wide, scarcely visible from above; second ventral segment shorter than the two following segments together, prolonged at the sides, the third scarcely attaining the lateral margin; pygidium oblique, acutely margined, with transverse elevated line for reception of the elytral apex. Legs long and slender, femora unarmed, posterior a little more robust, tibiæ very slender, middle and posterior feebly emarginate above the apex, tarsi long, third joint broadly bilobed, fourth shorter than the two preceding joints together, claws armed with a strong tooth about half as long as the claw; surface densely scaly.

Structurally, this genus is closely related to *Auleutes*, from which it is distinguished by the great irregularity of the prothorax, the tufts and crests of erect scales on the elytra and the dense scaly vestiture. It is represented by a single species.

**P. cristatus** n. sp. Pl. xii, fig. 16.—Oval, dark piceous, legs a trifle paler, antennæ testaceous, densely clothed with rather small, grayish white and brownish scales, elytra with crests of erect seal-brown scales. Beak a little shorter than the prothorax, gradually widened from the base toward the apex, densely punctured, pubescent, neither carinate nor striate; antennæ inserted just beyond the middle (♂), first joint of funicle very stout, short, second slender, elongate, joints 3–7 gradually shorter, outer joints not wider, club elliptoidal, acuminate.

Eyes large, somewhat prominent, with a decidedly cupreous lustre. Head densely punctured and scaly, channeled between the eyes; prothorax very little wider than long, dorsal channel distinct, somewhat widened from behind forward and extending to the edge of the anterior declivity, limited laterally by a not very obvious ridge, between this and the lateral tubercle is another oblique, less defined groove or sulcus, anterior margin emarginate at the middle with two small approximate cusps, ocular lobes small, basal margin biemarginate, disc densely and not coarsely punctured. Elytra two-fifths wider at the base than the prothorax, sides straight and parallel for one-half their length, then obliquely narrowed to and separately rounded at the apex; striæ fine, feebly impressed, each with a row of scales concealing the punctures, interspaces flat, alternately a little more convex and crested with lines of erect seal-brown scales interrupted by spots and short lines of white, depressed scales, the flattened interspaces without crests, a basal line on the sutural interspace of very dark velvety, but not erect scales, extending almost one-third the length of the elytra; seen from above there is an ill-defined, brownish fascia, extending from behind the humeral callus obliquely to the suture at the juncture of the middle and last thirds; pygidium finely punctured; underside rather coarsely punctured, sterna densely scaly, ventral segments less densely clothed with coarse piliform scales. Legs rather densely scaly. Length 2.25 mm.; 0.09 inch.

♂. Pygidium feebly channeled, with a brush of recurved hair at the apex, abdomen somewhat flattened along the middle, last ventral segment with well defined, transverse fovea, middle and posterior tibiæ feebly unguiculate at the apex.

*Hab.*—District of Columbia.

A single male specimen of this very interesting species in Mr. Ulke's collection.

## ORCHESTOMERUS gen. nov.

Beak stout, curved, funicle of antennæ 7-jointed. Eyes large, transversely oval and rather convex; prothorax wider than long, narrowed anteriorly, with prominent ocular lobes. Elytra broadly oval, convex, alternate interspaces wider; scutel very minute; pygidium very coarsely punctured; pectoral canal extending upon the mesosternum (*Wickhami*) or metasternum (*Ulkei*); metasternum short, second abdominal segment shorter than the two following segments together, prolonged at the sides, the third segment scarcely attaining the lateral margin, anterior and middle coxal cavities not entirely closed within, the latter scarcely more widely separated than the former; anterior coxæ moderately prominent, middle coxæ small, globular and closely approximate to the anterior, posterior coxæ widely separated; femora deeply sulcate for the reception of the tibiæ, posterior strongly incrassate; tibiæ simple, tarsal claws toothed.

The species are broadly oval, very convex insects, readily recognized by the strongly incrassate posterior femora. Increased size of

the posterior femora occurs also in other members of this subtribe, notably in *Acanthoscelis*, and also to a less extent in *Polenosomus*, without, however, attaining anything to what we find in the present genus. But two species are known to me, which are distinguished as follows:

Prothorax not gibbous, elytra with cruciform spot of pale scales. Pl. xii, fig. 17. **Ulkei.**

Prothorax gibbous, no cruciform elytral spot. Pl. xiii, figs. 18 and 18*a*. **Wickhami.**

**O. Ulkei** n. sp. Pl. xii, figs. 17, 17*a*.—Oval, pitchy brown, antennæ and feet testaceous, above sparsely clothed with fine, white piliform scales, underside with similar, though somewhat larger scales. Beak cylindrical, striate and punctured toward the base, pubescent throughout, antennæ slender, inserted at the middle (♂), funicle 7-jointed, first joint stout, second slender and longer than the first, joints 3–4 equal, outer joints gradually wider, club elongate, acuminate. Head closely punctured, squamous, front slightly concave; prothorax nearly one-half wider than long, broadly rounded on the sides and gradually narrowed from base to apex, latter scarcely constricted, transversely impressed in front, ocular lobes prominent, distinct, apical margin feebly emarginate at the middle, obtusely bicuspidate, lateral tubercles distinct, not acute, dorsal channel well impressed in its basal half, gradually narrowed anteriorly and becoming obsolete in front, an obtuse elevation each side about the middle, between this elevation and the lateral tubercle, there is an oblique impression, surface closely punctured, punctures large, especially near the base, the latter emarginate each side, a spot of white scales in front of each lateral tubercle. Elytra convex, about as long as wide, nearly one-third wider at the base than the prothorax, humeri oblique, rounded on the sides and narrowed posteriorly; striæ deep, wide, closely and distinctly punctured, interspaces convex, alternately wider, punctured; a conspicuous, cruciform scutellar spot of whitish scales, humeri white, disc with ill-defined spots and bands of condensed white pubescence, mesosternum excavate; femora deeply sulcate, posterior flattened, broadly dilated, broadly impressed near the apex; tibiæ parallel, subangulate near the base, less so on the anterior pair, middle and posterior tibiæ emarginate externally above the apex, tarsi moderately stout, third joint broadly bilobed, fourth rather short, claws armed with a long acute tooth. Length 2.7 mm.; 0.11 inch.

♂. Last ventral segment with transverse apical fovea, middle and posterior tibiæ unguiculate at the apex.

*Hab.*—New York.

A male specimen in Mr. Ulke's coll., to whom it gives me pleasure to dedicate this species. The specimen before me presents a peculiar aberration, the anterior and middle femora on the left side are quite slender, scarcely clavate, while those on the right side are flattened and impressed near the apex, similar to the posterior pair. I feel at a loss as to what is normal and what otherwise. Should further specimens prove the latter condition to be the normal one, I would

suggest the separation of this species from *Orchestomerus* and place it as the type of a new genus, to which the term *Platymeristes* might be applied.

**O. Wickhami** n. sp. Pl. xiii, figs. 18, 18*a*, 18*b*, 18*c*.—Broadly oval, convex, brown, antennæ and legs paler, above more densely clothed with small, oval, or piliform whitish scales, irrorate with brown, underside remotely punctured and sparsely clothed with small, pale scales. Beak stout, much shorter than the prothorax, curved, striate each side, punctured and coarsely pubescent from the base to beyond the middle, scrobes deep, directed against the eyes and expanded toward their extremity; antennæ stout, first and second joints of funicle not elongate, former stout, joints 3–4 equal, outer joints wider, club subcompressed, broadly oval. Eyes large, convex. Head densely punctured, squamose, front depressed between the eyes, a median and supra-orbital line each side, of pale scales; prothorax wider than long, strongly gibbous, very markedly narrowed anteriorly, sides nearly straight, constricted at the apex, ocular lobes prominent, rounded, lateral tubercles large, prominent, rectangular, dorsal sulcus deep, on each side a longitudinal gibbosity, base emarginate each side, disc closely punctured, two lines each side, in front of lateral tubercle of white scales. Elytra scarcely as long as wide, nearly two-fifths and rather suddenly wider at the base than the prothorax, somewhat declivous at the base, rounded on the sides and narrowed from the humeri to the apex, striæ more deeply impressed towards the base, punctured, punctures concealed by the scales, alternate interspaces wider and a little more convex, an elevation on the base of the third, fifth and eight (humeral) interspaces, an elongate scutellar spot of velvety brown scales; pygidium very coarsely and not closely punctured; pectoral canal deep, wide, not extending upon the metastêrnum; middle coxæ more widely separated than the anterior; femora mutic, anterior and middle subclavate, posterior incrassate; tibiæ rather short, parallel, subangulate near the base, tarsi slender, third joint less broadly bilobed, fourth joint short, claws armed with a long, acute tooth. Length 2.5 mm.; 0.10 inch.

♂. Last ventral segment transversely impressed, middle and posterior tibiæ with a very minute hook at the apex.

*Hab.*—Brownsville, Texas.

A male specimen collected during the past season and kindly given to me by my friend, Mr. F. H. Wickham, to whom it is with pleasure that I dedicate this addition to the rhynchophorous fauna of our country.

## ACALLODES Lec.

Beak stout, curved, widened towards the apex, about as long as the prothorax, scrobes deep, linear, directed against the eye, antennæ inserted two-fifths from the apex (♂ and ♀), scape not attaining the eye, funicle 7-jointed, club elliptic, acuminate. Eyes rounded, not convex, front flattened; prothorax wider than long, ocular lobes prominent, lateral tubercles obsolete, basal margin straight, scutel

not visible. Elytra ventricose, widest at or behind the middle, not obviously wider at the base than the prothorax, striate and punctured; pygidium inflexed, anterior and middle coxal cavities not widely separated, not entirely closed within; prosternum short in front of the coxæ, ante-coxal ridges prominent, acute, mesosternum feebly excavate, metasternum short, perpendicularly declivous in front; anterior and middle coxæ prominent, posterior widely separated; second ventral segment longer than the two following united, the third widely attaining the lateral margin. Legs rather long; thighs, at least the posterior, toothed; tibiæ slender, widened at the apex, tarsi moderately stout, third joint broadly bilobed, fourth shorter than the two preceding joints united, claws armed with a long tooth.

The pectoral canal is solely formed by the separated anterior and middle coxæ, the mesosternum is slightly concave, the posterior limit being formed by the mesosternum and the perpendicular metasternum conjointly. Dr. LeConte describes the femora as mutic, which is erroneous; the tooth, while small on the anterior pair, becomes quite distinct on the middle, and still more so on the hind thighs.

I have to add a second species to the one described by LeConte.

Prothorax not much wider than long, not wider at the base than at the middle, elytra with distinct humeral callus, a distinct elytral fascia. Pl. xiii, fig. 19. **ventricosus.**

Prothorax much wider than long, widest at the base, neither humeral callus nor elytral fascia. Pl. xiii, fig. 20.....**saltoides.**

**A. ventricosus** Lec. Pl. xiii, figs. 19, 19*a*.—Ovate, convex, piceous, antennæ and legs rufous, thinly clothed with fine pubescence, thoracic vittæ, scutellar spot and transverse fascia of small, oval, whitish scales. Beak punctured throughout, subglabrous, indistinctly striate each side in its basal half, first joint of antennal funicle robust, second elongate, slender, following joints short, club elliptic, acuminate. Head coarsely punctured, sparsely pubescent; prothorax a little wider than long, less than one-fourth wider at the base than at the apex, sides nearly straight, subparallel for one-half their length, feebly rounded anteriorly, broadly impressed in front, apex scarcely constricted, dorsal channel distinct, becoming wider in front, disc coarsely punctured, punctures more crowded on the sides and behind the apical margin, each bearing a short hair, median vitta and one each side, of pale scales. Elytra scarcely wider at the base than the prothorax, oval, very convex, humeri oblique, callus distinct, sides rounded and subconjointly rounded at the apex, striæ well impressed, shining, strongly and closely punctured, interspaces wider than the striæ, flattened on the disc, more convex on the declivity, rugose, alternately a little wider; a very conspicuous white scutellar line, a suboblique fascia before and a transverse one behind the middle, less conspicuous; these fascias are formed by short lines on the interspaces, those on the wider interspaces are placed a little in advance of the others,

the space inclosed between the two fascias is a little darker than the rest of the surface; pygidium not densely punctured, punctures larger and smaller intermixed; sternal side pieces more coarsely, abdomen more finely punctured; femora feebly clavate, all armed with an acute tooth, emarginate before the apex; tibiæ unguiculate at the apex in both sexes, claws armed with a tooth. Length 2.75-4.0 mm.; 0.11-0.16 inch.

♂. Pygidium feebly impressed.

*Hab.*—Eastern, Middle and Southern States.

As will be seen, the measurements given above do not agree with those of LeConte; that author, however, had only two specimens before him, and those evidently of small size. I have taken this species in August on apple trees. In general habitus this species is not unlike the European genus *Seleropterus*, though much larger.

**A. saltoides** n. sp. Pl. xiii, fig. 20.—Closely allied to the preceding species, from which it differs as follows: Beak distinctly carinate for one-half its length. Eyes more convex, upper margin somewhat elevated. Head more finely punctured; prothorax almost twice as wide as long, two-fifths wider at the base than at the apex, widest at the base, obliquely narrowed on the sides for one-half their length, then rounded, broadly but not deeply impressed before the middle, dorsal channel less distinct, disc much more finely punctured. Elytra wider than long, viewed from above nearly circular, humeral callus obsolete, striæ deep, wide, almost as wide as the interspaces, these scarcely unequal, no scutellar spot, some faint traces of an anterior and posterior fascia; pygidium very coarsely and densely punctured. Length 3.35 mm.; 0.13 inch.

♂. Last ventral segment more broadly impressed, hook of middle tibiæ quite distinct, prominent.

*Hab.*—A single male specimen, Minnesota, in the Nat. Mus. coll.

The sutural white spot so conspicuous and evident in every one of the numerous specimens of *ventricosus* before me is entirely absent in the present species. Aside from the elytral markings, however, this species is quite different and distinct in habitus, resembling in this respect very much the Australian *Salcw globosus* Pasc.

## CŒLIODES Sch.

Beak more slender, long and curved, antennal funicle 7 jointed. Eyes rounded, feebly convex and entirely concealed in repose. Elytra wider at the base than the prothorax; pectoral canal limited posteriorly by the metasternum; second ventral segment as long or longer than the two following segments, the third widely attaining the lateral margin; anterior and middle coxal cavities not closed within, anterior and middle coxæ moderately prominent; pygidium perpendicular. Legs moderately stout, femora toothed (in our species), tibiæ simple, claws armed with a tooth.

As here defined the characters of the genus, as distinctive from the other genera of the subtribe *Cœliodes*, are negative rather than otherwise. The type of *Cœliodes* Sch. is the European *C. quercus*; this species, however, has the femora mutic and the pectoral canal prolonged to nearly the end of the metasternum and was subsequently made the type of *Megacœlus* Thomp.* Of eleven European species of *Cœliodes* in my collection, all, except *guttula* Fab. and *epilobii* Payk. (*Auleutes*) have the second ventral segment longer than the two following together, the latter very short, the third widely attaining the lateral margin.

The two species occurring in our fauna are densely squamous insects, and are distinguished as follows:

Larger, oval, lateral tubercles of prothorax obsolete, lateral spot and apex of elytra pale ..... **apicalis.**
Smaller, elliptic, lateral tubercles distinct, no elytral spots ..... **vitiosus.**

**C. apicalis** n. sp.—Oval, dark brown, antennæ and legs a trifle paler, densely clothed above and beneath with oval scales, brownish above with lateral and apical spot of the elytra of pale scales, scales of the underside dirty grayish white. Beak rather slender, curved, longer than the prothorax, subcarinate from the middle to near the apex, densely punctured and thinly squamous near the base, scrobes directed against and expanded before the eyes; antennæ inserted almost two-fifths from the apex (♂ and ♀), slender; first and second joints of funicle elongate, following joints shorter, outer a little widened, club elongate or acuminate. Head densely punctured, squamous, front flattened; prothorax scarcely wider than long, moderately narrowed anteriorly, rounded on the sides, apex deeply constricted, deeply impressed behind the apical margin, ocular lobes nearly obsolete, basal margin straight each side, dorsal channel more deeply impressed before and behind or subinterrupted at the middle, lateral tubercles obsolete, indicated by a short ridge-like elevation, surface densely and rather evenly punctured, punctures small, sides clothed with pale scales; scutel glabrous, scarcely visible. Elytra scarcely one-fourth wider at the base than the prothorax, a little longer than wide, broadly and regularly rounded on the sides, moderately convex, striæ fine, deep, punctures very small, each bearing a pale scale, interspaces wide, flat, rugulose, a sutural line from the first third to near the apex, of darker scales with some lustre, an oblique spot on the 6-9 interspaces before the middle and apical margin, of pale yellowish white scrobes, the apical pale space encloses a dark spot; metasternum deeply emarginate, excavate; underside of body closely and superficially punctured; femora dentate, obscurely annulate with pale scales near the apex, tibiæ somewhat stout and widened towards the apex, obscurely annulate near the base and apex, tarsi elongate, third joint not broadly bilobed, fourth shorter than the two preceding joints, claws armed with a slender tooth about one-half the length of the claw, the first and second joints with several bristle-like hairs arising near the apical margin; pygidium densely and finely punctured, pubescent. Length 2.75-3.25 mm.; 0.11-0.13 inch.

* G. Thompson, Scandinav. Col. I, p. 339.

♂. Fifth ventral segment with transverse oval fovea in its apical half, middle and posterior tibiæ distinctly unguiculate at the apex.

♀. Fifth ventral not impressed, tibiæ not unguiculate.

*Hab.*—Pennsylvania, Canada, Ohio, Wisconsin, Michigan, Dakota, Colorado, Texas.

Numerous specimens are before me. Some specimens have the lateral margin of the elytra pale. This species has heretofore been known in collections as *C. flavicauda* Boh.,* the description of which is utterly inapplicable in all essential points, save one, to the insect under consideration. Aside from other differences the following characters certainly do not apply here "thorace medio tenuiter carinata. Elytra antice singulatim rotundata, thoracis basi multa latiora —ante-mediam fascia transversa communi, subdentata, parce obscura brunneo-squamosa ornati." The size is stated as equal to that of *C. quercus* F., an insect very much smaller, the largest specimen of which, in my collection, does not exceed 2.5 mm. No mention is made of the lateral or apical pale spots on the elytra or a thoracic sulcus. The femoral tooth is described obtuse, while it is quite acute. Boheman refers this species to Say. I have been unable to find any reference or description of *flavicauda* in Say's writings.

**C. vitiosus** n. sp.—Oval elliptic, convex, dark piceous; antennæ, tibiæ and tarsi rufo-piceous, scales on the underside larger, nearly round, dirty gray, not crowded, above clothed with much smaller, oval, grayish brown scales. Beak slender, curved, obscurely carinate from near the base to the apex, densely punctured, striolate; scrobes linear, not expanded before the eyes; antennæ inserted a trifle beyond the middle (♂), not very slender, first and second joints of funicle elongate, joints 3 4 equal, outer joints shorter, gradually wider, club elliptoidal, acuminate. Eyes a little convex, a short sulcus in front of each. Head densely and rather coarsely punctured, squamous, front flattened; prothorax as long as wide, two-fifths wider at the base than at the apex, the latter broadly and strongly constricted, sides straight, parallel for two-fifths their length, then obliquely narrowed to the apical constriction, ocular, lobes distinct, apical margin straight, subangulate each side; basal margin not emarginate each side, lateral tubercles distinct, acute, dorsal channel entire, more deeply impressed before and behind the middle, surface closely punctured, punctures rather large. Elytra oval, about one-fourth wider at the base than the prothorax, a little longer than wide, broadly rounded on the sides and strongly narrowed toward the apex, basal margin elevated, striæ as wide as the interspaces, not deeply impressed, punctures rather closely approximate, concealed by the scales; interspaces flattened, a line of dark brown scales on the middle two-fourths of the sutural interspace; metasternum as in *apicalis*, femora subclavate, distinctly toothed, tibiæ widened towards the apex, tarsi as in the preceding species, claws armed with a tooth extending a little beyond the middle. Length 2.5 mm.; 0.10 inch.

* Sch., Gen. Curc. viii, p. 397.

♂. **Last ventral segment transversely impressed, middle and posterior tibiæ unguiculate at the apex.**

*Hab.*—Hazleton, Pa.

A male specimen which I collected many years ago. In form this species resembles the European *C. quadrimaculatus* L., but is smaller and without any maculation. The darker line on the middle of the sutural interspace is less distinct than in the preceding species.

Subtribe *Ceutorhynchi.*

A large number of species, all of which, with the exception of one, belong to the genus *Ceutorhynchus*, represent this subtribe, and are at once distinguished from all other members of the present tribe by the pectoral canal not extending beyond the prosternum and the slender, elongate rostrum; antennæ very variable, funicle 7- or 6-jointed. Eyes rounded, lateral, widely separated above and more or less covered in repose; prothorax narrowed anteriorly, generally constricted at or behind the apex; scutel distinct in some, scarcely visible in others. Elytra not much wider at the base than the prothorax, striate and punctured; prosternum long in front of the coxæ, deeply and generally narrowly emarginate, with ante-coxal ridges; mesosternum not canaliculate, oblique (*Ceutorhynchus*), or depressed and transversely sulcate between the middle coxæ (*Rileyonymus*); anterior coxæ narrowly, middle more widely separated; middle coxal cavities entirely enclosed (*Ceutorhynchus*), rarely open within (*Rileyonymus*); second ventral segment not prolonged on the sides, third widely attaining the lateral margin, segments 3-4 short, fifth longer (*Ceutorhynchus*), segments 3-5 longer, equal (*Rileyonymus*); femora either dentate or mutic; tibiæ generally slender, middle and posterior unguiculate at the apex in the male (except *angulatus* group), claws bifid, toothed or simple.

As indicated above, the establishment of a new genus seems called for.

**Mesosternum oblique, not sulcate, middle coxal cavities closed within, ventral segments 3-5 unequal, third tarsal joint bilobed....Ceutorhynchus.**

**Mesosternum depressed, transversely sulcate, middle coxal cavities open within ventral segments 3-5 equal, third tarsal joint not bilobed.**

**Rileyonymus.**

**CEUTORHYNCHUS.**

With the exception of the characters which distinguish the following from the present genus what has been said regards the present subtribe in general applies generically here and not much else needs

to be added. As already stated by Dr. LeConte* the beak is stouter and more coarsely sculptured (generally in Curculionidæ) and the last ventral segment impressed or foveate in the males.

I have divided the species into the following groups:

Femora toothed.
  Vestiture dense, longer species.
    Funicle 7-jointed ..... **subpubescence group.**
    Funicle 6-jointed ..... **angulatus group.**
  Vestiture very sparse, subglabrous, frequently with metallic lustre.
    **sulcipennis group.**

*Femora mutic.*
  Funicle 7-jointed, claws toothed.
    Elytra distinctly tuberculate ..... **tuberculipennis group.**
    Elytra not tuberculate, generally muricate on the declivity. - convexicollis
  Funicle 7-jointed, claws simple ..... **squamatus group.**
  Funicle 6-jointed, claws simple ..... **septentrionis group.**

**subpubescence group.**

Species above median size, having the antennal funicle 7-jointed, the claws bifid, or distinctly toothed, rarely (*isolatus*) simple. They are more or less densely scaly or pubescent and may be distinguished as follows:

Claws armed with a long tooth, nearly bifid, less densely scaly or pubescent.
  Above clothed with fine brownish pubescence intermixed with large white scales ..... **subpubescens.**
  Above uniformly clothed with gray or pale ochreous scales ..... **affluentus.**
  Scales white, not uniform, intermixed with coarse hair .... **seriesetosus.**
Claws simple; hirsute ..... **isolatus.**
Claws armed with a short, stout tooth.
  Scales dense, a conspicuous scutellar spot.
    Prothorax cribrate ..... **rudis.**
    Prothorax more finely punctured ..... **sericans.**

**C. subpubescens** Lec.—Subrhomboidal, pitchy black, above clothed with fine, pale brownish pubescence, intermixed on the elytra with scattered, large, white scales. Beak slender, curved, about as long (♂), or longer (♀) than the prothorax, slightly tapering towards the apex, finely striate and punctured in its basal half, more finely punctured and shining towards the apex, antennæ slender, inserted at the middle (♂ and ♀), first and second joints of funicle elongate, second slender, joints 3-4 very little (♂) or distinctly longer (♀) than the outer joints, club large, ovoidal, acuminate. Eyes round, not prominent, completely concealed in repose by the prominent postocular lobes. Head rather coarsely punctured, coarsely pubescent; prothorax wider than long, fully two-fifths wider at the base than at the apex, latter strongly constricted behind the apical margin, sides broadly rounded, lateral tubercles distinct, placed transversely, dorsal sulcus entire, less profound at the middle, disc densely and rather coarsely punctured;

* Proc. Amer. Philos. Soc. xv, p. 272.

scutel minute. Elytra oval, less than one-third wider at the base than the prothorax, humeri rounded, sides broadly rounded to the apex, declivity somewhat precipitous, the summit with acute granules, striæ fine, each with a row of pale piliform scales, punctures very small, interspaces wide, flattened, rugose; pygidium punctured, squamous; underside closely punctured, densely scaly, scales large, grayish white, crowded. Legs slender, femora subclavate, all armed with a large, acute tooth, tibiæ subparallel, a little widened at the apex, articulating surface open posteriorly, tarsi slender, third joint broadly bilobed, fourth a little shorter than the two preceding joints combined, claws armed with a long slender tooth, parallel to the claw and about two-thirds its length. Length 2.75-3.5 mm.; 0.11-0.14 inch.

♂. Last ventral segment with a broad, oval fovea, limited each side by a prominent ridge, middle and posterior tibiæ unguiculate.

*Hab.*—California, Utah (Salt Lake City, Walhsah Mountains).

Two male and two female specimens are before me. Very closely related to the next species. Two specimens from Utah are a trifle smaller and have the pubescence a little more coarse. A specimen in Mr. Bolter's coll., which I consider to belong to the present species, has the pubescence entirely grayish white, closely resembling typical specimens of the next.

**C. affluentus** n. sp.—Oval, black, above uniformly clothed with grayish white, piliform scales not closely appressed to the surface, underside densely scaly, scales whitish, round or oval. Beak longer than the prothorax, cylindrical, of equal thickness throughout, punctured and striate from the base to the insertion of the antennæ, more finely punctulate beyond, antennæ slender, inserted a little beyond (♂), or before (♀) the middle; first and second joints of funicle elongate, latter slender, joints 3-4 longer than the outer joints, which are a little wider outwardly; club elliptical, acuminate. Eyes, head and general configuration of prothorax as in *subpubescens;* prothorax a little less rounded on the sides, impressed each side before the middle, lateral tubercles small, transverse, dorsal channel entire, more superficial about the middle and terminating in front in a more or less profound fovea; scutel distinct, scaly. Elytra about one-fourth wider at the base than the prothorax, finely striate, punctures very small, concealed by scales, interspaces wide, flattened, rugose, declivity with small, acute granules; pygidium more coarsely punctured. Legs and tarsi as in *subpubescens;* anterior femoral tooth small. Length 3.0-3.25 mm.; 0.12-0.13 inch.

♂. Last ventral segment as in the preceding, middle and posterior tibiæ unguiculate.

This species, erroneously known in our lists and collections as *rapæ* Gyll., bears only a superficial resemblance to its European congener, while differing in most important structural characters. *C. rapæ* Gyll. differs from *affluentus* in the following points: Beak very slender, almost piliform, more finely punctulate and glabrous throughout, except at the base in the female; antennæ inserted just before the middle (♂), or scarcely more than one-third from the

base ( ♀ ), elytral interspaces more narrow, scarcely double the width of the striæ, femora *mutic*, claws *simple*. Length 2.75 mm.; 0.11 inch. Aside from its smaller size it could not be distinguished from *affluentus* on superficial comparison.

*Hab.*—Canada, Eastern and Western States.

*Var.*—Above and beneath clothed with pale, ochreous scales, elytral striæ with a row of whitish scales.

Occurs in Maryland, Virginia, Illinois, Kansas and Nebraska.

**C. seriesetosus** n. sp.—Elongate, subtrapezoidal. Black, prothoracic lobes and tarsi testaceous, above irregularly clothed with elongate, dirty white scales, intermixed with coarse hair-like bristles, directed forward on the prothorax, backward on the elytra, underside more densely clothed with pale yellowish, or white, oval or elongate scales without intermixed hair. Beak very slender, longer than the prothorax, subglabrous, very finely punctured, striolate on the sides, antennæ slender, inserted about the middle, first and second joints of funicle elongate, latter slender, joints 3-4 a little shorter, outer joints wider, club large, ovoidal. Eyes entirely concealed in repose; head finely and densely punctured, squamous; prothorax one-half wider than long, about two-fifths wider at the base than at the apex, strongly constricted behind the apical margin, rounded on the sides, lateral tubercles distinct, acute, dorsal channel deep before and behind, interrupted at the middle; scutel minute, glabrous. Elytra less than one-third wider at the base than the prothorax, humeri rounded, somewhat prominent, sides nearly straight, gradually narrowed behind, declivity with acute granules, which become quite prominent on the posterior callus, when viewed from above; striæ and punctures very fine, punctures rather remote, interspaces flat, somewhat shining, very finely rugose, each with a row of fine punctures, each bearing a whitish seta, a distinct scutellar spot and other spots irregularly scattered of white or pale yellowish scrobes. Legs slender, femora and tibiæ more or less scaly or coarsely pubescent; femora with a small, acute tooth, nearly obsolete on the anterior pair; tibiæ parallel, not widened at the tip, latter testaceous, third tarsal joint very broadly bilobed, fourth a little longer than the former, claws armed with a large tooth, inclined towards its fellow. Length 3.0 mm.; 0.12 inch.

♂. Last ventral segment impressed, apical spurs distinct, though small.

*Hab.*—Nantucket Island, Massachusetts.

Three specimens collected by Mr. A. Bolter are before me. A very distinct species, readily distinguished from the preceding by the rows of elytral setæ and from the next by the strongly toothed claws.

Since the above was written I have received from Mr. F. A. Sirrine four specimens of this species, three of which were bred from the seed-stalks of kale at Cutchogue (L. I.), N. Y. They are a little smaller in size than Mr. Butler's specimens, the femoral teeth very small, obsolete on the anterior pair.

**C. isolatus** n. sp.—Oblong, black, antennæ piceous, legs rufo-piceous, above thinly clothed with white piliform scales, intermixed with long coarse pubescence,

underside densely and rather coarsely punctured and more densely clothed with elongate scales. Beak slender, one-half longer than the prothorax, cylindrical, a trifle wider at the base, finely striate and punctured in its basal half, subglabrous towards the apex, antennæ inserted just before the middle, slender, joints 1-4 of funicle gradually shorter, first joint very robust in the male, and like the second a little more elongate in the female, outer joints very short, club moderately large, ovoidal, acuminate. Eyes entirely concealed in repose. Head densely punctured, front with a flattened or impressed oval space, limited each side by a row of erect scales, the space clothed with white scales; prothorax much wider than long, rounded on the sides behind, profoundly constricted in its anterior third, lateral tubercles represented by an acute, longitudinal ridge, dorsal sulcus entire, not well defined, base broadly emarginate each side: scutel distinct, glabrous. Elytra one-third wider at the base than the prothorax, humeri oblique, sides nearly straight for three-fourths their length, then suddenly rounded to the apex; declivity, and especially the posterior callus, with prominent, acute granules; striæ and punctures very fine, superficial, punctures remote, interspaces wide, flattened, each with a row of setigerous punctures, setæ long, suberect, a conspicuous scutellar spot and less distinct spots on the disc of condensed white scales; pygidium punctured, subcarinate in the male. Legs not slender, femora subclavate, each armed with a large triangular tooth, tibiæ moderately stout, a little flattened, widened towards the apex, third joint of tarsi not broadly bilobed, fourth long, claws simple. Length 2.25 mm.; 0.09 inch.

♂. Last ventral segment feebly impressed, tibial hooks distinct.

*Hab.*—Montana; Elko, Nevada; California.

Three specimens, Mr. Ulke's and my own coll. The Nevada specimen has the elytral striæ coarser and deeper, the elytral setæ are pale in two specimens, blackish in the third, the legs entirely ferruginous in one, rufo-piceous in a second and dark piceous in the third specimen, thus showing again the futility of superficial characters in the demarcation of species.

**C. rudis** Lec. Pl. xiii, fig. 21.—Oblong, oval, piceous, legs rufous, above very thinly clothed with very small, pale brown, piliform scales, variegated on the elytra with scattered spots of pure white and a large scutellar spot of similar scales on the base of the first and second interspaces and extending a little farther on the second interspace than on the first, underside clothed with whitish scales. Beak feebly curved, not slender, somewhat tapering from the base, striate and punctured in its basal half, more finely punctured beyond; antennæ slender, inserted before the middle (♀), first and second joints of funicle elongate, former a little stouter, joints 3-4 shorter, outer joints a little wider, club large, ovoidal. Eyes concealed in repose. Head coarsely punctured, each puncture bearing a coarse, brownish hair, an impressed frontal line with white scales; prothorax much wider than long, rounded on the sides behind, strongly narrowed in front and deeply constricted behind the apical margin, latter elevated, lateral tubercles represented by an acute oblique elevation, dorsal channel deep, with a few pale scales, surface very coarsely and deeply punctured, each puncture bearing a coarse hair; scutel distinct. Elytra subtrapezoidal, a little wider at the base than the prothorax, humeri rounded, sides nearly straight, gradually narrowed behind, strongly rounded on the tip, striæ impressed, punctured, each with a row of white

piliform scales, interspaces flattened, rugose, declivity with a few very small, but acute granules; femora subclavate, each with a large triangular tooth; tibiæ stout, widened from base to apex, latter rounded, tarsi rather stout, third joint not broadly bilobed, fourth short, claws with a short, acute basal tooth. Length 2.8 mm.; 0.11 inch.

*Hab.*—Nevada, Kansas (LeConte).

A single female specimen in Mr. Ulke's collection. Closely related to *sericans*, from which it is readily distinguished by its very coarsely punctured prothorax.

**C. sericans** Lec.—Oblong, depressed, pitchy black, above densely clothed with very small, brown scales with a faint pearly lustre and inconspicuously mottled with pale scales, underside densely clothed with dirty white scales. Beak about as long as the prothorax, curved, not very slender, striate and punctured nearly throughout in the male, glabrous in its apical third in the female, antennæ slender, inserted scarcely two-fifths from the apex (♂ and ♀), first and second joints of funicle of equal length, former more robust, third joint shorter than the second, longer than the following joints, club elongate elliptic. Eyes concealed in repose. Head channeled, coarsely punctured, clothed with elongate scales, whitish on the front and along the channel; prothorax more than one-half wider than long and two-fifths wider at the base than at the apex, rounded on the sides, narrowly constricted at the apex, apical margin elevated, lateral tubercles distinct, obtuse, posterior to these the lateral margin is straight, disc densely and finely punctured, punctures concealed by the scales, channel entire, more deeply impressed near the base; scutel minute. Elytra trapezoidal and little wider at the base than the prothorax, humeri oblique, prominent, sides nearly straight, narrowed behind, striæ well impressed, closely punctured, interspaces flattened, about twice as wide as the striæ, declivity not obviously muricate, a conspicuous line on the base of the sutural interspace of whitish scales, scales on the declivity pale. Legs squamous, femora subclavate, all armed with a large tooth; tibiæ moderately stout, widened towards the apex, tarsi slender, third joint not broadly bilobed, fourth nearly as long as the two preceding joints together, claws armed with a small, basal tooth. Length 2.5-3.0 mm.; 0.10-0.12 inch.

♂. Last ventral segment with a deep, transversely oval fovea, apical spurs of tibiæ distinct, minute.

*Hab.*—Iowa, Colorado, Arizona, California (LeConte).

Two males and four females. Dr. Horn's and Mr. Ulke's coll.

A very pretty species, the purple gloss is not noticeable in some specimens. Although Dr. LeConte describes the vestiture as "scale-like hairs" and gives the length as 2.0 mm.; there is no doubt of the identity of this species.

### angulatus group.

The species belonging to this group have the antennal funicle 6-jointed, the femora (at least the posterior pair) toothed and the claws simple, they all have the elytra ornamented with patterns of condensed scales. The eyes are entirely concealed in repose by promi-

nent prothoracic lobes; the tibiæ are not armed at the apex in the males. They are distinguished as follows:

Anterior margin of prothorax deeply and acutely emarginate, elytra with angulated band of white scales. Pl. xiii, fig. 22.....**angulatus.**
Anterior margin of prothorax slightly emarginate in the middle.
Larger species, elytra subdepressed, oblique lateral spot distinct.
Tibiæ shorter, stout, widened at the apex, a —∩— shaped basal spot. Pl. xiii, fig. 23.....**consanguineus.**
Tibiæ long and slender, very little widened towards the apex.
Above clothed with fine, pruinose pubescence, head not sulcate. **disturbatus.**
Above clothed with larger white scales, intermixed with brown pubescence, head broadly sulcate.....**obliquus.**
Above clothed with dark gray or fuscous scales, inverted T-shaped spot at base.....**tau.**
Very small, elytra convex, lateral spot wanting. Pl. xiii, fig. 24.**ovipennis.**

**C. angulatus** Lec. Pl. xiii, fig. 22.—Broadly oblong oval, depressed, black, antennæ and legs rufo-piceous, above thinly clothed with very small, pale scales, an angulated band of white scales on the elytra, underside clothed with round, whitish scales. Beak a little (♂) or one-third (♀) longer than the prothorax, rather strongly curved, cylindrical, punctured throughout, indistinctly striolate on the sides, with closely placed, short, suberect scales, scrobes curved, and when viewed laterally, not visible at the middle, antennæ slender, inserted about the middle, funicle 6-jointed, joints 1-2 elongate, second slender and longer than the third joint, outer joints short, club large, elliptic. Head superficially punctured, punctures large; prothorax a little wider than long, strongly narrowed in front, ocular lobes prominent, broadly rounded on the sides, transversely impressed in its anterior half; apical margin elevated, deeply and acutely emarginate, lateral tubercles large, a strongly curved marginal edge, extending from the latter to the apical margin; dorsal sulcus wide, entire, sides and sulcus clothed with white scales; disc densely and coarsely punctured; scutel minute. Elytra one-third, and rather suddenly wider at the base than the prothorax, scarcely longer than wide, slightly narrowed from the humeri three-fifths their length, then suddenly rounded to the apex, posterior callus somewhat prominent, sides feebly rounded, striæ impressed, wide, punctures small, more or less concealed by the scales, interspaces convex, rugose, the angulated band extends from below the humerus on the ninth interspace, obliquely and becoming wider to the sixth, then ascends in a curved line to the second interspace to the base, some lines of white scales on the declivity; femora clavate, armed with a very small tooth, almost obsolete on the anterior pair, tibiæ rather stout, a little widened at the tip, tarsi slender, first and second joints elongate, first a little longer than the second, third short, broadly bilobed, fourth as long as the first joint, claws small, slender and divergent. Length 3.0-3.25 mm.: 0.12-0.13 inch.

♂. Last ventral segment with a deep, transverse fovea, occupying the whole length of the segment, middle and posterior tibiæ not unguiculate.

*Hab.*—California.

Two males, seven females, Drs. Horn and Hamilton, Mr. Ulke's and Nat. Mus. coll. Dr. LeConte included in this species also the

form hereafter described as *disturbatus*, a quite distinct species. The angulated band is interrupted on the fifth interspace in most specimens. LeConte described the front as concave, it is such in some specimens, flattened or even somewhat convex in others. It is distinguished from all the other members of this group by its broader form and the deeply notched anterior thoracic margins.

**C. consanguineus** n. sp. Pl. xiii. fig. 23.—Oblong oval, depressed, pitchy black, legs rufous, above rather densely clothed with brown scales, a —∩— basal spot and an oblique lateral spot on the elytra of white scales, underside as in *angulatus*. Beak as long (♂), or a little longer (♀) than the prothorax, curved, slender, cylindrical, finely punctured and striate, feebly shining near the apex, scrobes and antennæ as in the preceding, the latter slender, inserted two-fifths from the apex (♂), or a trifle beyond the middle (♀). Head coarsely punctured, front flattened or slightly concave, squamous; prothorax one-half wider than long, strongly narrowed from base to apex, deeply constricted behind the apical margin, sides convergently rounded from the base, ocular lobes less prominent than in *angulatus*, lateral tubercles transverse, not prominent, curved, marginal line in front ill-defined, dorsal channel entire, surface coarsely punctured, channel and sides clothed with pale yellow scales, less conspicuous than in the preceding species; scutel small, glabrous. Elytra a little wider at the base than the prothorax, humeri obliquely rounded, longer than wide, sides feebly rounded, slightly narrowed posteriorly, striæ fine, superficial, punctures concealed by a row of scales, interspaces flattened, the lateral spot extends from the ninth to the sixth interspaces inclusive, the basal spot consists of a spot on the base of the sutural interspace and a short line on the second jointed to a short subtransverse line on the third and fourth interspaces, some scattered white scales on the declivity; pygidium coarsely punctured, scaly, underside densely punctured. Legs stout, femoral tooth very small, acute, anterior and middle tibiæ short and stout, widened to the apex, the latter rounded, posterior tibiæ a little longer and a little more slender, thighs and tibiæ indistinctly annulate with white scales, tarsi as in *angulatus*, but a little stouter. Length 2.5-2.75 mm.; 0.10-0.11 inch.

♂. Last ventral segment with superficial and ill-defined fovea, tibiæ not unguiculate.

*Hab.*—Nevada. Three specimens in Dr. Horn's coll.

A distinct species, similar to *angulatus*, though less robust; elytral ornamentation very similar, ascending branch absent, the transverse line on the third and fourth interspaces is nearer the base; also resembles the next species in general appearance, but differs in the stout tibiæ and the conspicuous marking at the base of the elytra.

**C. disturbatus** n. sp.—Oblong oval, dark piceous, above thinly clothed with small, pale scales, scales on the underside round, grayish white, not crowded. Beak slender, curved, a little longer than the prothorax in the male, one-half longer in the female, punctured throughout, more finely in the female, striate in its basal half, scrobes and antennæ as in the preceding species, the latter inserted two-fifths from the apex (♂), or at the middle (♀). Head densely punctured; prothorax wider than long, strongly narrowed in front, rounded on the sides and

deeply constricted behind the anterior margin, latter not elevated, scarcely emarginate at the middle, lateral tubercles distinct, transverse, acute, dorsal channel entire, narrowed from the base to the apex, surface densely and rather coarsely punctured, sides and channel clothed with pale scales; scutel minute, glabrous. Elytra one-third wider at the base than the the prothorax, a little longer than wide, gradually narrowed from the humeral prominence, striæ wide, well impressed, closely and distinctly punctured, interspaces rather convex, rugose, posterior callus obsolete, lateral spot as in the preceding species, a spot on the fourth interspace, about one-fourth from the base of white scales, femora feebly clubbed, distinctly toothed, tooth of anterior pair very small, tibiæ moderate, widened toward the apex, thighs and tibiæ obscurely annulate with white scales, tarsi and claws as in *angulatus*. Length 2.2-2.7 mm.; 0.09-0.11 inch.

♂. Last ventral segment distinctly foveate, tibiæ not unguiculate.

*Hab.*—California, Vancouver, Oregon, Washington, British Col.

Numerous specimens are before me. Confounded with *angulatus*, from which it is sufficiently distinguished by its smaller size, less robust form, the anterior thoracic margin very slightly emarginate and the absence of an angulated elytral fascia. The lateral spot is present in all the specimens before me, the spot on the fourth interspace is occasionally wanting; in some specimens there are some smaller spots near the base and on the declivity.

**C. obliquus** Lec.—Oblong, subdepressed, piceous, legs rufo-piceous, above clothed with small, brown appressed and larger white suberect scales, the latter predominating. Beak curved, long and slender, longer than the prothorax, punctured and striate, less punctured and somewhat shining towards the apex in the female, scrobes less curved and visible, when viewed laterally, in their whole extent; antennæ inserted two-fifths from the apex (♂), or just beyond the middle, first joint of funicle stout, second joint slender, longer than the third, three outer joints short, club ovoidal. Head broadly sulcate with a crested line each side of stout, erect scales; prothorax a little wider than long, two-fifths wider at the base than at the apex, the latter broadly and strongly constricted, sides rounded, apical margin slightly emarginate at the middle, lateral tubercles large, channel distinct, entire, surface coarsely punctured, sides and channel clothed with elongate, whitish scales; scutel quite distinct, glabrous. Elytra longer than wide, one-third wider at the base than the prothorax, feebly rounded on the sides and narrowed posteriorly; striæ very fine and superficial with a row of white, piliform scales concealing the very small punctures, interspaces wide, flattened, rugose, lateral spot as in *angulatus*, the surrounding space less densely clothed with white scales, thus giving it a shaded appearance, another less conspicuous spot at the apex of the sutural striæ; underside densely punctured and scaly, scales large, dirty gray, crowded; femora not robust, tooth rather large, distinct on all, tibiæ straight, slightly widened from base to apex, tarsi and claws as in *angulatus*. Length 2.8 mm.; 0.11 inch.

♂. Last ventral segment with large and sharply defined fovea; tibiæ not unguiculate.

♀. Pygidium impressed.

*Hab.*—California (Lec. Nat. Mus. coll.), Arizona (Dr. Horn's and Mr. Ulke's coll.), Texas (A. Bolter), Utah (my own coll.).

Var. A.—Two female specimens in my collection from Utah differs from the typical form in the more finely punctured prothorax, a basal spot similar to, but less defined to that of *C. consanguineus* and interruptedly connected with an ascending line from the oblique lateral spot, the white scales of the elytra more closely appressed, with an irregular row of white piliform scales on each elytral interstice. The femoral teeth are quite distinct in one specimen, almost obsolete in the other.

Var. B.—A female specimen from Texas in Mr. Bolter's collection is less elongate, antennæ testaceous and inserted two-fifths from the apex. Head with a broad fovea, elytral striæ deeper, interspaces a little convex, very rugose, the brown scales scarcely evident, scatterd, a sutural line of white scales interrupted at the middle third by a black space; pygidium convex, covered with yellowish scales, anterior and middle femoral tooth obsolete, posterior distinct. A distinct variety.

**C. tau** Lec.—Ovate, narrowed in front and less so behind, depressed, blackish, densely clothed with dark gray scales, which are smaller and more fuscous above. Beak curved, slender, sparsely punctured, striate towards the base. Head densely punctured; prothorax as in *angulatus*, but more oblique rounded on the sides. Elytra less oblong, more distinctly narrowed behind, similarly striate and rugose, with a large scutellar spot like an inverted T, and an oblique lateral spot densely clothed with gray scales; antennæ and legs brown, similar to those of *C. angulatus*. Length 3.0 mm.; 0.12 inch.

One specimen, Texas, Belfrage; also closely allied to the preceding and differing only by form and elytral spots.

I have not seen this species, and can therefore only transcribe the description as given by LeConte.

**C. ovipennis** n. sp. Pl. xiii, fig. 24.—Oval, convex, pitchy black, tibiæ and tarsi paler, above thinly clothed with small, brownish scales, elytral spots of large white scales, underside more sparsely clothed with small, oval, pale scales. Beak rather stout, strongly curved, evenly cylindrical, punctured throughout, antennæ not very slender, inserted a trifle beyond the middle (♀), similar to *C. obliquus*. Head with impressed line, coarsely but not closely punctured; prothorax nearly twice as wide as long, two-fifths wider at the base than at the apex, the latter broadly and deeply constricted, strongly rounded on the sides, lateral tubercles distinct, acute, transverse, dorsal sulcus indistinct except at the base, disc coarsely punctured, punctures crowded on the sides and on the basal half, sides in front and median line clothed with white scales; scutel small, distinct. Elytra oval, convex, very little wider at the base than the prothorax, humeri oblique, sides regularly rounded to the apex, striæ fine and more superficial on the disc, wider and more deeply impressed on the sides, distinctly punctured, interspaces somewhat convex, roughened; an oblique line of white scales extending obliquely upward from the sixth interspace to the second and interrupted on the fifth, some

scattered white scales on the disc, especially on the declivity; pygidium transversely impressed each side; underside not densely punctured, punctures rather small, superficial. Legs and tarsi somewhat stout, femora not clavate, tooth, distinct on the posterior pair only, tibiæ feebly curved, widened to the apex, first and second joints of tarsi scarcely longer than wide, third more broadly bilobed, fourth joint longer than either of the preceding joints, slender, claws simple. Length 2.2 mm.; 0.09 inch.

♂. Last ventral with a large, well defined fovea; tibiæ not unguiculate.

*Hab.*—Dunsmuir, Cal.; British Columbia. Dr. Horn's and my own coll. Two males.

### sulcipennis group.

The species of this group have the femora dentate, the elytra more or less shining and very thinly pubescent, without patterns of condensed scales, except a scutellar spot. The antennal funicle is 6- or 7-jointed, claws toothed or simple. They are all of moderate size and may be distinguished as follows:

Elytra coarsely sculptured, striæ deep, sulciform, interspaces with a row of acute granules, claws armed with a long tooth.
- Funicle 7-jointed ..... **sulcipennis.**
- Funicle 6-jointed ..... **decipiens.**

Elytra not coarsely sculptured, without rows of acute granules.
- Funicle 7-jointed, claws toothed.
  - Elytra blue ..... **cyanipennis.**
  - Elytra æneous ..... **æratus.**
- Funicle 7-jointed, claws simple.
  - Elytra dark blue ..... **bolteri.**
  - Elytra entirely black ..... **hirticollis.**
- Funicle 6-jointed.
  - Entirely ferruginous, elytra acutely tuberculate on the declivity, claws toothed ..... **armatus.**
  - Black, declivity with a few small, acute granules ..... **pollinosus.**

**C. sulcipennis** Lec.—Oval, black, antennæ and tarsi piceous, above very thinly clothed with a very fine, pale pubescence. Beak curved, a little (♂) or considerably (♀) longer than the prothorax, obscurely carinate, finely punctato-striolate throughout in the male, finely punctured and shining beyond the insertion of the antennæ in the female; antennæ slender, inserted just beyond (♂), or immediately before (♀) the middle, funicle 7-jointed, joints 1-4 elongate, second longer than the others, outer joints short, club elliptoidal, acuminate. Eyes only partially concealed in repose by the feebly developed postocular lobes, round, slightly convex. Head convex, coarsely punctured; prothorax wider than long, strongly narrowed anteriorly, rounded on the sides, widest a little behind the middle, constricted at the apex, lateral tubercles acute, quite distinct, dorsal channel wide, deeply impressed, extending from the base to the apical constriction, surface coarsely and subconfluently punctured; scutel distinct. Elytra ovate, convex, shining, one-third wider at the base than the prothorax, rounded on the sides and narrowed from the humerus to the apex, sulcate, sulci

finely and not closely punctured, interspaces rugose, each with a row of acute, setigerous granules, setæ white, recurved, posterior callus obsolete; pygidium coarsely punctured, convex (♂), or slightly foveate (♀); underside coarsely punctured, not densely clothed with whitish scales. Legs slender, thinly pubescent, femora subclavate, armed with a very small, acute tooth, tibiæ long, widened toward the apex, tarsi slender, third broadly bilobed, fourth almost as long as the first two joints together, claws armed with a long tooth, curved towards its fellow. Length 2.75 mm.; 0.11 inch.

♂. Middle and posterior tibiæ strongly unguiculate.

*Hab.*—Atlantic, Western and Southern States.

A well-known species; readily known by its very coarse sculpture, in which it resembles the next species, but from which it is at once distinguished by the 7-jointed funicle and the strongly unguiculated tibiæ of the male.

**C. decipiens** Lec.—Subovate, black, antennæ and legs rufous, above very thinly clothed with pale, piliform scales, a conspicuous scutellar spot of white scales; underside coarsely but not densely punctured, sparsely scaly except on the thoracic side pieces, which are densely clothed with white scales. Beak curved, separated from the head by a transverse impression, a little longer than the prothorax, cylindrical, indistinctly subcarinate, striate and punctured from the base to the insertion of the antennæ, less densely punctured beyond, antennæ moderately stout, inserted a trifle beyond the middle, funicle 6-jointed, joints 1-3 elongate, gradually wider, club elliptic. Eyes completely concealed in repose by prominent prothoracic lobes. Head convex, coarsely punctured and pubescent; prothorax wider than long, about one-fourth wider at the base than at the apex, sides subparallel and nearly straight for one-half their length, rounded before the middle, broadly but not deeply constricted behind the apical margin, base emarginate each side, lateral tubercles conspicuous, dorsal sulcus obsolete, densely punctured on the sides and on the base, less so on the disc, punctures coarse, a curved line of white scales each side; scutel scarcely visible. Elytra ovate, rather convex, fully two-fifths wider at the base than the prothorax, broadly rounded on the sides from the humerus to the apex, sulcate, rather coarsely punctured, punctures separated about their own length, interspaces convex, feebly shining, each with a row of setigerous granules, setæ subdepressed, coarse, straight, an ill-defined spot near the base of the seventh and a common sutural spot, at the apex, of white scales, there are also some scattered scales on the declivity. Legs not slender, femora subparallel, all armed with an acute tooth, less distinct on the anterior pair, tibiæ rather stout, subparallel, very little widened toward the apex, the latter not unguiculate, tarsi slender, third joint bilobed, short, fourth as long as the first joint, claws armed with an acute basal tooth. Length 2.0-2.5 mm.; 0.08-0.10 inch.

♂. Last ventral segment with a deep, transversely oval fovea, tibiæ not unguiculate at the apex.

*Hab.*—Colorado, Michigan, Utah, California, Kansas (LeConte), Pennsylvania (my own coll.).

Very closely resembles the European *Rhytidosomus globulus* in sculpture and general appearance; this insect, however, has the

femora deeply sulcate for the reception of the tibiæ, which is not the case in *Ceutorhynchus;* in form it is short, contracted and very convex.

**C. cyanipennis** Germ.—Oblong, oval, subdepressed, black, elytra steel-blue, shining, antennæ and legs piceous, above sparsely clothed with fine, short pubescence and a scutellar spot of white pubescence. Beak a little longer than the prothorax in the male, one-half longer in the female, curved, slender, tapering from the base, striate and punctured from the base to the insertion of the antennæ, more finely punctured and shining towards the apex, antennæ long and slender, inserted immediately before (♀), or, a trifle beyond the middle, funicle 7-jointed, joints 1-2 elongate, first longer, joints 3-4 shorter than the second, outer joints short, gradually wider, club elliptoidal. Head moderately convex, densely punctured and pubescent; prothorax wider than long, two-fifths wider at the base than at the apex, rounded on the sides, broadly constricted behind the apical margin, less distinctly on the sides, apical margin slightly emarginate at the middle, basal margin broadly emarginate each side, lateral tubercles prominent, dorsal sulcus deep, ending at the apical constriction, surface closely and coarsely punctured; scutel distinct, scaly. Elytra a little wider at the base than the prothorax, feebly rounded on the sides, narrowed behind, striæ fine, distinctly and closely punctured, interspaces flat, rugose; pygidium rather finely punctured; underside not densely punctured, punctures small, thoracic side pieces densely clothed with white scales. Legs long and slender; femora feebly clavate, all armed with an acute tooth, small on the anterior pair, tibiæ subparallel, slightly widened at the apex, latter not unguiculate, tarsi slender, third joint moderately bilobed, fourth joint equal to the first, claws armed with an acute basal tooth. Length 2.75-3.25 mm.; 0.11-0.13 inch.

♀. Last ventral segment with large, but ill-defined impression and two apical tubercles; tibiæ not unguiculate.

*Hab.*—N. Illinois, California.

Introduced from Europe within recent years. Careful comparison with typical specimens in my collection leave no doubt of its identity. It is readily recognized by its steel-blue elytra, and could only be confounded with *C. bolteri*, from which it differs, by its larger size and toothed claws.

**C. serratus** n. sp.—Elongate, black, with æneous lustre especially marked on the elytra, above very thinly clothed with fine, short pubescence, underside with the exception of the sternal side pieces, sparsely clothed with white scales. Beak curved and slender, longer than the prothorax, finely striate and punctured from the base to the insertion of the antennæ, shining and scarcely punctured beyond, antennæ slender, inserted two-fifths from the apex (♂), funicle 7-jointed, joints 1-2 elongate, 3-4 shorter, subequal, outer joints short, club elliptical. Head closely and not coarsely punctured; prothorax wider than long, gradually narrowed from the base, sides feebly rounded for three-fourths their length, broadly but not strongly constricted behind the apical margin, ocular lobes prominent, lateral tubercles small, acute; dorsal channel distinct, wide, not deep, disc coarsely punctured, punctures not crowded, each bearing a short hair. Elytra elongate

oval, moderately convex, a little wider at the base than the prothorax, humeri oblique, somewhat prominent, broadly rounded on the sides, posterior callus obsolete, striæ wide, well impressed, distinctly and rather remotely punctured, interstices not much wider than the striæ, slightly convex, a scutellar spot of white scales; pygidium not coarsely punctured, anterior coxæ very narrowly separated; femora feebly clavate, middle and posterior with a rather large tooth; tibiæ parallel, tarsi rather stout, third broadly bilobed and as long as the preceding joint, fourth short, projecting less than the length of the third, claws armed with a short, acute, basal tooth. Length 2.5 mm.; 0.10 inch.

♂. Last ventral segment deeply impressed in its apical half; tibiæ not unguiculate at the apex.

*Hab.*—Ohio.

A single male specimen in Mr. Ulke's coll. is the type of this interesting addition to our fauna. The bright æneous lustre of the elytra at once distinguishes this species.

**C. bolteri** n. sp.—Oblong oval, blackish, elytra dark steel-blue, above sparsely clothed with short, fine pubescence, a scutellar spot of white scales, underside finely and not closely punctured, scales grayish white, not dense. Beak curved, slender, somewhat shining, striate and punctured from the base to the insertion of the antennæ, more finely punctured and shining toward the apex; antennæ slender, inserted just before (♂) or at the middle (♀), funicle 7-jointed, first and second joints elongate, joints 3–4 subequal, outer joints short, club elliptical. Head densely punctured, clothed with coarse pubescence; prothorax one-half wider than long, one-third wider at the base than at the apex, narrowed from base to tip, sides feebly rounded, broadly constricted behind the apical margin, the constriction scarcely evident on the sides, dorsal channel less distinct at the middle, ocular lobes prominent, lateral tubercles small, acute, disc not very closely punctured, punctures of moderate size; scutel small, scaly. Elytra one-fourth wider at the base than the prothorax, humeri oblique, gradually narrowed from the humeral prominence, striæ fine, superficial, punctures small, interstices slightly convex, rugose, shining; femora feebly clavate, all armed with an acute tooth, smaller on the anterior pair, tibiæ slender, parallel, widened at the tip, tarsi rather slender, third joint bilobed, first and second joints short, subequal, fourth longer than the first joint, claws simple. Length 2.5 mm.: 0.10 inch.

♂. Last ventral segment transversely impressed; middle and posterior tibiæ unguiculate at the apex.

*Hab.*—N. Illinois.

A ♂ and ♀ specimen kindly given to me by Mr. A. Bolter, to whom it gives me pleasure to dedicate this species. The specimens had the label "*C. erysimi* F." attached, and this species certainly bears a very close resemblance to the European, from which, however, it differs by its larger size, the toothed femora and much more slender tarsi. I have specimens of *C. erysimi* F. from France, Belgium, Greece and Karpathes Mountains, widely removed localities, which show no difference whatever. In this species the underside of the body and the legs have a decided æneous lustre.

**C. hirticollis** n. sp.—Oblong oval, black, elytra with a faint chalybeous lustre, prothorax clothed above with long, coarse pubescence, elytra very finely pubescent, underside clothed with small, piliform scales. Beak long and slender, curved, striate and punctured from the base to the insertion of the antennæ, punctulate and shining toward the apex; antennæ inserted two-fifths from the apex (♂), or at the middle (♀), funicle 7-jointed, joints 1-2 longer, following joints gradually shorter, club ovidal. Head convex, closely punctured, clothed with elongate, pale yellowish scales; prothorax one-half wider than long, one-third wider at the base than at the apex, rounded on the sides, feebly constricted at the apex when seen from above, anterior half transversely impressed, impression sharply limited posteriorly, anterior margin with two very small, but acute and rather remote cusps, lateral tubercles small, acute, dorsal channel entire and extending through the anterior transverse impression, ocular lobes well developed, sides and basal half coarsely and closely punctured, more finely punctured on the anterior half, transverse impression, dorsal sulcus and a line each side, clothed with long, coarse, pale yellowish pubescence; scutel very minute. Élytra nearly one-third wider at the base than the prothorax, humeri somewhat prominent, gradually narrowed posteriorly, sides broadly rounded, posterior callus feeble, striæ well defined, superficial, punctures very small, not closely approximate, interspaces flattened about twice as wide as the striæ, finely rugose; underside finely punctured. Legs long and slender, femora armed with a large and very acute tooth, tibiæ subparallel, gradually widened to the apex, tarsi slender, slightly compressed, third joint not broadly bilobed, fourth a little shorter than the two preceding joints together, claws simple. Length 2.5 mm.; 0.10 inch.

♂. Last ventral segment with deep and sharply defined transverse fovea, tibiæ unguiculate.

*Hab.*—Illinois, Wisconsin.

Mr. A. Bolter's and my own coll. A quite distinct species.

**C. armatus** n. sp.—Oval, robust, entirely ferruginous, above nearly glabrous, shining, very sparsely clothed with a fine, scale-like pubescence, underside finely and superficially punctured and clothed with small, pale scales. Beak much longer than the prothorax, curved, cylindrical, slightly tapering toward the apex, striate and punctured in its basal half, more shining and punctulate toward the apex, antennæ slender, testaceous, inserted a trifle beyond the middle, funicle 6-jointed, joints 1-3 elongate, first joint longer, second and third equal, outer joints short, club rather small, elongate acuminate. Head convex, densely and coarsely punctured; prothorax wider than long, one-third wider at the base than at the apex, narrowed from the base, rounded on the sides, scarcely constricted on the sides, but deeply impressed behind the elevated apical margin, the latter entire, lateral tubercles absent, dorsal channel obsolete, except a slight impression at the base and at the apex, surface densely punctured, punctures moderate, basal margin straight each side, ocular lobes feeble; scutel minute, glabrous. Elytra scarcely longer than wide, a little wider at the base than the prothorax, narrowed behind, feebly rounded on the sides, striæ impressed, wide, strongly and closely punctured, interspaces slightly convex, smooth and shining, each with a row of very fine setigerous punctures, setæ erect, whitish, declivity acutely tuberculate, especially on the fifth, sixth and seventh interspaces; pygidium very small (♀), visible only between the apices of the elytra; anterior coxæ scarcely prominent, antecoxal ridges very acute. Legs slender, femora armed with a small, acute

tooth; tibiæ being slender, parallel, tarsi narrow, third joint feebly bilobed, fourth joint long, claws small, armed with a long basal tooth. Length 2.5 mm.; 0.10 inch.

*Hab.*—Texas.

A female specimen in Mr. Ulke's coll. A peculiar species, the very small pygidium, not visible from below, the fifth ventral segment filling the apical space between the elytra and the scarcely prominent anterior coxæ, might justify its generic separation, for want of more material, especially the male, I prefer to leave it where it is.

**C. pollinosus** n. sp.—Oblong oval, black, thinly clothed above, with very small, pale scales, underside densely punctured, each puncture bearing a pale, but somewhat larger scale. Beak rather stout, coarsely punctured throughout, obscurely subangulate about the insertion of the antennæ, the latter inserted two-fifths from the apex (♂), or at the middle (♀), funicle 6-jointed, joints 1-3 longer, club ovoidal. Head densely punctured; prothorax wider than long, strongly narrowed in front, rounded on the sides, broadly and strongly constricted at the apex, ocular lobes not prominent, anterior margin elevated, slightly emarginate, lateral tubercles obtuse, dorsal sulcus entire, disc evenly and coarsely punctured: scutel minute. Elytra one-third wider at the base than the prothorax, humeri prominent, sides nearly straight and very little narrowed posteriorly for about three-fourths their length, striæ rather wide, impressed, closely punctured, interspaces flattened, less than twice the width of the striæ, rugose, with a feeble lustre, sutural interspace glabrous, declivity feebly muricate; pygidium large, densely punctured. Legs moderate, femora feebly clavate, armed with a very small, acute tooth, tibiæ rather stout, a little widened towards the apex, tarsi stout, first and second joints not longer than wide, third moderately bilobed, fourth projecting the length of the preceding joint, claws simple. Length 2.25-2.5 mm.; 0.09-0.10 inch.

♂. Last ventral segment foveate, tibiæ not unguiculate.

*Hab.*—California. Dr. Horn's and Mr. Ulke's coll.

A male and female specimen are before me. Recognized by its entirely black color and the glabrous sutural interspace.

**hornii group.** tuberculipennis

The species which constitute this group are characterized by the elytra being distinctly tuberculate. The antennal funicle consists of seven joints, the femora are mutic and the claws toothed or cleft. The middle and posterior tibiæ are unguiculate in the males.

Only three species belong here, which are distinguished as follows:

Larger species, above glabrous, claws with a short basal tooth ..... **hornii.**
Smaller, densely squamous, claws bifid.
Elytral interspaces with a row of tubercles..... **nodipennis.**
Tubercles confined to the humeral region and the declivity.... **adjunctus.**

**C. hornii** n. sp. Pl. xiii, fig. 25.—Oval, black, depressed, above glabrous, very thinly pubescent, underside densely and finely punctured and clothed with elongate, white scales. Beak moderately slender, curved, very little longer than the prothorax (♂), striate and punctured beyond the middle, shining near the apex, scrobes parallel, nearly straight, widened posteriorly; antennæ slender, inserted just before the middle, first and second joints of funicle elongate, former stouter, joints 3-4 shorter, equal, outer joints scarcely wider, club large, ovoidal, acuminate. Eyes round, somewhat convex, not entirely concealed by the feeble postocular lobes. Head densely punctured, pubescent, front concave; prothorax one-half wider than long, nearly two fifths wider at the base than at the apex, well rounded on the sides and deeply constricted behind the apical margin, the latter elevated lateral tubercles in form of an elevated transverse ridge, concave on its anterior face, dorsal sulcus entire, ill-defined on the disc and ending in a fovea anteriorly, surface densely punctured, punctures large, superficial, basal margin straight; scutel elongate, glabrous. Elytra one-third and rather suddenly wider at the base than the prothorax, sides feebly rounded, subparallel for three-fourths their length, then strongly rounded to the apex, striæ sharply defined, not deeply impressed, closely punctured, interspaces wide, each with a row of large, acute tubercles, tubercles directed backward and bearing on their posterior face near the summit a straight and nearly horizontal seta, sutural interspace with a line of white scales, its outer half with a row of smaller tubercles; pygidium perpendicular (♂), slightly inflexed and rather large, punctured; anterior coxæ narrowly separated. Legs long, femora scarcely clavate, mutic, tibiæ slender, gradually widened towards the apex, tarsi slender, first and second joints elongate, third broadly bilobed, lobes long, fourth joint long and slender, projecting the length of the preceding joint, claws armed with a small, obtuse, basal tooth. Length 3.0-3.2 mm.: 0.12 0.13 inch.

♂. Last ventral segment deeply foveate, fovea circumvallate in its anterior half, tibiæ unguiculate.

*Hab.*—Southern California. Three males, Dr. Horn's coll.

Different from any Ceutorhynchid known to me, and at once recognized by its glabrous, strongly tuberculate elytra and white sutural vitta. I dedicate this species, with pleasure, to my friend, G. H. Horn.

**C. nodipennis** n. sp.—Oval, depressed, black, densely clothed above and beneath with large, grayish white, or pale ochreous scales. Beak slender, about as long (♂), or much longer (♀) than the prothorax, cylindrical; finely punctate and striate toward the apex and squamose in its basal third, remotely punctulate and shining beyond in the female; antennæ slender, inserted just before the middle (♂), or one-third from the base (♀), first two joints of funicle elongate, first very little stouter than the second, joints 3-4 equal, outer joints a little wider, club large, ovoidal, acuminate. Eyes not entirely concealed by the fairly well developed, prothoracic lobes. Head convex, densely scaly; prothorax wider than long, a trifle over one-fourth wider at the base than at the apex, sides broadly constricted behind the apical margin, the latter elevated, feebly emarginate at the middle, lateral tubercles transverse, prominent, dorsal channel evident, but like the punctures concealed by the crowded, piliform scales, base broadly emarginate each side: scutel scarcely visible. Elytra one-third and rather suddenly, wider at the

base than the prothorax, subtrapezoidal, a little longer than wide, finely striate, punctures concealed by the scales, interspaces wide, three to eight with a row of large, acute tubercles, each bearing a short setæ on its posterior face near the summit, the fourth interspace is tuberculate in its apical third only, the sixth for two-thirds its length; pygidium perpendicular, small, scaly. Legs densely scaly, femora feebly clavate, tibiæ not slender, widened towards the apex, tarsi slender, first and second joints elongate, the former longer than the latter, third broadly bilobed, lobes long, fourth joint long and slender, nearly as long as the two preceding joints together, claws bifid. Length 2.5 mm.; 0.10 inch.

♂. Last ventral segment with longitudinal fovea; tibiæ unguiculate.

*Hab.*—Los Angeles, Cal., on a species of *Ceanothus* (Coquillett).

Ten specimens, Nat. Mus. coll., are before me. Very closely related to the next species.

**C. adjunctus** n. sp.—This species entirely agrees with the preceding in form, habitus and the density of its scaly covering and from which it is to be distinguished by the following characters: scales pale, yellowish white. Legs rufo-testaceous, elytral interspaces alternately wider, elytral tubercles confined to the humeral region and the summit of the declivity, several small tubercles near the base of the sixth interspaces, the wider interspaces with some flattened granules, entirely concealed by the scales and scarcely perceptible. Length 2.25 mm.; 0.09 inch.

♂. Last ventral segment broadly foveate, tibiæ unguiculate.

*Hab.*—Utah, Nevada.

Dr. Horn's and Mr. Ulke's collections. A specimen in Mr. Ulke's collection bears the label "*C. stanleyi* Schwarz." As I am not aware that this species has been described, and all my efforts to ascertain if such has been done have proven of no avail, I am compelled to consider it a nondescript, perfectly willing to renounce authorship when the original description may come to light.

### convexicollis group.

Contains all those species with 7-jointed antennal funicle which have the femora mutic, claws toothed and the elytra at most muricate on the declivity. The species are fairly numerous and more closely allied, presenting no special habitus and varying in size from medium to minute. All have the first and second joints of the funicle elongate, former more robust, joints 3–4 shorter, equal, club variable. The males in all have the fifth ventral segment foveate, and the middle and posterior tibiæ unguiculate at the apex.

The following analytical table, together with the specific descriptions and illustrations, will enable the student to determine his material:

Second and third joints of anterior tarsi together longer than the fourth. Pl. xiv, fig. 31*b*.

Dark piceous or black, antennal club elongate, acuminate; elytral interspaces without a row of setæ. Pl. xiv, fig. 30.

Lobes of third tarsal joint longer, fourth not projecting more than the length of the third joint. Pl. xiv, fig. 31*b*.

Oblong, tarsi slender, no sutural vitta.....**mutabilis.**

Broadly oval, tarsi stout, a white sutural vitta.....**ovalis.**

Lobes of third tarsal joint short, the fourth projecting more than the length of the third.

Larger, scales not intermixed with fine pubescence.....**intermedius.**

Smaller, above finely pubescent, sprinkled with larger scales.**nummulus.**

Legs ferruginous, antennal club less elongate, ovoidal (if entirely black, elytra with rows of erect setæ).

Elytral interspaces without rows of setæ.

Densely and uniformly squamous.....**hamiltoni.**

Pubescent above, apical part of elytra more or less rufous.

Tarsi stouter, second and third joints about equal, fourth projecting scarcely more than the length of the third joint.....**pusio.**

Tarsi more slender, joints 1–3 gradually shorter, fourth long, projecting nearly twice the length of the third.....**adspersulus.**

Elytral interspaces with a row of erect setæ.

Larger, oblong, prothorax less rounded on the sides, legs ferruginous. **pusillus.**

Very small, entirely blackish, oval, prothorax strongly rounded on the sides. **pauxillus.**

Second and third joints together, of anterior tarsi, shorter than the fourth; antennal club broadly oval, not acuminate, elytra with rows of suberect setæ. Pl. xiv, figs. 31*c*, 30*a*.....**convexicollis.**

**C. mutabilis** n. sp. Pl. xiv, figs. 30, 31*b*.—Oblong oval, entirely black, above sparsely clothed with larger, appressed, white scales, intermixed with small, suberect, piliform scales arranged in one or more irregular rows on the elytral interspaces, underside clothed with whitish scales, which are rounded or oval on the sterna, piliform on the abdomen. Beak long and slender, curved, striate and punctured, squamous at the base; antennæ slender, club, elongate-elliptic, acuminate. Eyes not entirely concealed in repose. Head convex, densely punctured, front flattened or slightly concave; prothorax wider than long, one-third wider at the base than at the apex, strongly rounded on the sides, rather suddenly narrowed in front, strongly and broadly constricted at the apex, apical margin elevated, straight or nearly so, ocular lobes prominent, lateral tubercles small, transverse, dorsal sulcus entire, well impressed throughout, disc densely and rather finely punctured, each puncture bearing a coarse, scale-like hair, a line each side and along the dorsal channel of pale scales; scutel small, glabrous. Elytra a little wider at the base than the prothorax, oblong, a little narrowed behind, slightly rounded on the sides, posterior callus with a group of acute granules, striæ wide, well impressed, distinctly and closely punctured, interspaces somewhat convex, very rugose, a scutellar spot and short sutural line of white scales more or less distinct; pygidium and underside densely punctured. Legs clothed with squamiform pubescence, femora clavate, mutic, tibiæ subparallel, tarsi slen-

der, first and second joints elongate, third broadly bilobed, fourth shorter than the two preceding joints together and projecting as much as the length of the fourth, claws rather large and armed with an acute, basal tooth. Length 2.5-2.75 mm.; 0.10-0.11 inch.

*Hab.*—Santa Rosa County, California (Dr. Horn), San Francisco County (Nat. Mus. coll., Ulke), Kansas (Ulke).

This species varies considerably in appearance, according as the larger scales are present or not. A specimen in Mr. Ulke's collection from Kansas has the thoracic punctures larger, but does not differ otherwise. Another specimen in the same collection from California differs by its smaller size (2.25 mm.) and the suberect scales on the elytral interspaces arranged in a single row.

**C. ovalis** n. sp. Pl. xiii, figs. 26, 26*a*, 26*b*.—Oval, convex, dark piceous, above thinly clothed with fine, brownish pubescence and scattered, large, oval, white scales, a scutellar spot and sutural vitta of similar scales, underside densely clothed with large, oval, white, or yellowish white scales, especially crowded on the sternal side pieces. Beak not very slender, curved, finely striate and punctured from the base to the insertion of the antennæ, remotely punctured and shining toward the apex, antennæ not very slender, inserted a little beyond (♂), or at the middle (♀), club elongate acuminate. Eyes nearly covered in repose by the prominent prothoracic lobes. Head densely punctured, front flattened; prothorax wider than long, narrowed from the base, the latter one-third wider than the apex, not strongly constricted at the apex, sides broadly rounded, apical margin elevated, feebly emarginate, base nearly straight each side with the antescutellar lobe rather prominent, lateral tubercle obsolete, surface closely and finely punctured, dorsal channel entire, wide and more deeply impressed near the base; sides, anterior impression and median line, clothed with white scales; scutel very small, scaly. Elytra oval, convex, a little more than one-fourth wider at the base than the prothorax, sides rounded, striæ fine, impressed with a row of minute scales, which conceal the closely placed punctures, interspaces wide, flattened, rough, a few, very minute, though acute granules on the declivity; pygidium and underside densely punctured; femora subclavate, tibiæ widened to the apex, feebly curved, tarsi rather stout, the second and third joints together, longer than the fourth, which projects about the length of the preceding joint, the latter broadly bilobed, claws small, with an acute basal tooth. Length 2.75-3.0 mm.; 0.11-0.12 inch.

*Hab.*—Illinois, Minnesota. Three specimens, Nat. Mus. and Mr. A. Bolter's collection.

A very distinct species which may be readily recognized by its size, oval convex form and conspicuous sutural vitta.

**C. intermedius** n. sp.—Oblong, black, somewhat depressed, above clothed with small, white and pale brown scales, interspersed with scattered, large, white scales, underside densely covered with large, dirty gray scales. Beak long and slender, curved, shining almost throughout, finely punctulate toward and scaly at the base; antennæ not very slender, inserted one-third from the base (♀), outer joints of funicle widened, club large, elongate, acuminate. Head densely

punctured and scaly, scales grayish white; prothorax wider than long, fully one-third wider at the base than at the apex, strongly rounded on the sides, broadly and strongly constricted at the apex, apical margin elevated, ocular lobes feeble, base broadly emarginate each side, lateral tubercles distinct, obtuse, channel entire, more deeply impressed at the base, and in form of a fovea in front, a longitudinal impression each side in front of the lateral tubercle, disc rather coarsely punctured and clothed with coarse, gray pubescence, paler on the sides and along the dorsal channel; scutel scarcely visible. Elytra about one-fourth wider at the base than the prothorax, a little longer than wide and very little narrowed on the sides for three-fourths their length, then rapidly rounded to the apex, striæ deep, wide, closely punctured, each puncture bearing an elongate, white scale, interspaces little wider than the striæ, flattened, rugose, small scales suberect and arranged in one or two rows on each interspace, the large white scales condensed in an ill-defined scutellar spot and extending in a line along the sutural interspace, also on the side towards the apex; summit of the declivity with small, acute granules; tibiæ slender, parallel, tarsi with the first two-joints elongate, third joint bilobed, rather short, fourth shorter than the two preceding joints and projecting a trifle more than the length of the third, claws armed with an acute basal tooth. Length 2.75 mm.; 0.11 inch.

*Hab.*—Pennsylvania.

A female specimen in Dr. Horn's collection closely related to the following species.

**C. numulus** n. sp.—Oblong oval, dark piceous, above clothed with brownish pubescence, a sutural vitta and some scattered scales, white, underside densely clothed with dirty gray scales. Beak long and slender, squamous at the base, finely striate and punctured in its basal half, shining and more remotely punctulate toward the apex; antennæ inserted two-fifths from the base (♂), slender, outer joints of funicle scarcely wider, club large, elongate, acuminate. Eyes not completely concealed in repose. Head convex, obscurely sulcate, front impressed, densely punctured and scaly: prothorax more than one-half wider than long and nearly two-fifths wider at the base than at the apex, strongly rounded on the sides and constricted at the apex, apical margin elevated, ocular lobes distinct, prominent, lateral tubercles small, acute, dorsal channel less distinct at the middle, disc coarsely and closely punctured, coarsely pubescent, paler on the sides and along the dorsal sulcus, base slightly emarginate each side; scutel extremely minute. Elytra about one-fourth wider at the base than the prothorax, feebly rounded on the sides and gradually narrowed posteriorly, striæ and punctures fine, interspaces wide, flat, rugose, summit of the declivity strongly muricate, a short basal line on the second interspace, of white scales, similar scales aggregated along the base and on the sides towards the apex; pygidium densely scaly. Legs long and slender, femora subclavate, tibiæ subparallel, tarsi slender, second and third joints together longer than the fourth, the latter projects a little more than the length of the third joint which is not broadly bilobed, claws with an acute basal tooth. Length 2.25 mm.; 0.09 inch.

♂. Fovea of last ventral segment confined to the apical half, an obtuse tubercle each side.

*Hab.*—Texas.

A single male specimen, also in Dr. Horn's coll. Very closely

resembles *intermedius*, and, with more material, may prove to be identical. It appears to differ in the much finer pubescence, smaller size, more rounded form, prothorax less deeply impressed in front and the conspicuous sutural vitta; lastly, the far removed habitat from the preceding species should not be lost sight of.

**C. hamiltoni** n. sp.—Oblong, depressed, reddish brown, head and underside of body dark piceous, above densely clothed with small, yellowish brown scales, slightly variegated with paler scales, scales of the underside pale ochreous and somewhat larger. Beak slender, a little (♂) or considerably (♀) longer than the prothorax, feebly curved nearer the apex, finely punctured, scaly toward the base; antennæ slender, inserted a trifle beyond (♂) or just before the middle (♀), outer joints of funicle scarcely wider, club moderately large, ovoid. Head densely punctured and scaly, front flattened; prothorax one-half wider than long, fully one-third wider at the base than at the apex, well rounded on the sides and strongly constricted at the apex, ocular lobes obsolete, apical margin elevated, slightly emarginate, lateral tubercles small, acute, dorsal channel narrow, feebly impressed, disc densely punctured, punctures small, base biemarginate; scutel minute, glabrous. Elytra longer than wide, less than one-third wider at the base than the prothorax, broadly rounded on the sides and gradually narrowed behind, striæ fine, each with a row of scales concealing the punctures, interspaces wide, rugose, posterior callus with a few asperities; pygidium subcarinate, punctured and scaly. Legs slender, thinly covered with scales, femora not clavate, tibiæ subparallel, tarsi rather stout, first and second joints not elongate, second and third together longer than the fourth; claws with a short, acute basal tooth. Length 2.5 mm.; 0.10 inch.

♂. Last ventral with a deep, round fovea. ♀ with a circular impression.

*Hab.*—Massachusetts, Cape Cod (Hamilton), Truro (Dr. Horn), Nantucket Island (A. Bolter).

A very distinct species. Specimens in Dr. Hamilton's and Mr. Bolter's collections bear the memorandum "on *Kekele americana*."

**C. pusio** Mann.—Oval, convex, dark piceous, apical part of elytra and legs reddish brown, above thinly clothed with fine, brownish, scale-like pubescence, with spots and lines of larger, elongate, whitish scales. Beak cylindrical, feebly curved, shining, finely punctured, antennæ slender, inserted about the middle (♂), or two-fifths from the base (♀), outer joints of funicle very little wider, club elongate oval. Eyes not entirely concealed in repose. Head densely punctured and squamous, front impressed along the median line; prothorax wider than long, strongly narrowed from the base to the apex, the latter not constricted on the sides, sides broadly rounded, a wide impression behind the apical margin, lateral tubercles acute, anterior margin with two small, remote cusps, a curved line extending from the lateral tubercles to the apical cusps, dorsal channel obsolete on the disc; disc densely punctured, punctures rather small, ocular lobes feeble, base emarginate each side, sides densely clothed with whitish scales; scutel small, glabrous. Elytra fully one fourth wider at the base than the prothorax, oval, convex, scarcely longer than wide, rounded on the sides and obviously narrowed to the apex, striæ impressed, rather wide, closely punctured, interspaces

slightly convex, rugose, posterior callus feebly muricate, a large scutellar spot of pale scales; pygidium strongly carinate, sterna densely, abdomen more remotely and not deeply punctured, clothed with white scales, more dense on the sternal side pieces. Legs slender, pubescent, femora subclavate, tibiæ parallel, a little widened at the apex, tarsi not slender, first joint a little elongate, following two joints equal in length, third broadly bilobed, fourth projecting the length of the third joint, claws with a small basal tooth. Length 2.0–2.2 mm.; 0.08–0.09 inch.

♂. Fovea of last ventral segment large, deep and sharply defined.

♀. Last ventral segment with smaller, rounded and less sharply defined fovea.

*Hab.*—Western and Southern States, Colorado, Wyoming, Oregon, Vancouver, British Columbia.

Numerous specimens are before me. Dr. LeConte describes the claws as being simple, they are nevertheless toothed, the tooth being very small and readily overlooked. The elytra are more or less reddish brown, at least so, in their apical portion, entirely so in some specimens with the exception of a triangular basal space.

**C. adspersulus** n. sp.—Oblong oval, dark brown, antennæ, legs and apex of the elytra rufous, above thinly clothed with hair-like pubescence, interspersed with large, oval, white scales; underside densely scaly, scales elongate, piliform. Beak long, curved, striate and punctured towards the base, shining and punctulate beyond the insertion of the antennæ, the latter slender, inserted at the middle (♂), or before it (♀), joints 3–4 of funicle subequal, outer joints gradually wider, club oval, acuminate. Head densely punctured and pubescent, front squamous; prothorax more than one-half wider than long, one-third wider at the base than at the apex, strongly rounded on the sides and deeply constricted behind the apical margin, lateral tubercles transverse, not prominent, dorsal channel obsolete on the disc: disc evenly and closely punctured, punctures small, ocular lobes broad, not prominent, apical margin elevated, base nearly straight each side; sides, apical constriction and median line more densely clothed with white scales; scutel small, glabrous. Elytra longer than wide, one-fourth wider at the base than the prothorax, not markedly narrowed posteriorly, striæ fine, punctures small, remote, interspaces rugose, posterior callus with a few acute granules, a scutellar spot of white scales; femora and tibiæ at in *pusio*, tarsi slender, joints 1–3 gradually shorter, fourth joint long and slender, projecting about twice the length of the third, claws with a short basal tooth. Length 2.4 mm.; 0.11 inch.

♂. Ventral fovea rather deep.

*Hab.*—California, Arizona. Dr. Horn's and Nat. Mus. coll.

Closely resembles the preceding species, but is less narrowed in front and behind, the prothorax more strongly rounded on the sides and more finely punctured, the pubescence is finer and longer, the tarsi more slender with the fourth joint much longer than the third. The white spots on the elytra consist of single, large scales, instead of an aggregation of scales as in *pusio*. Dr. Horn's specimen has the sutural spot prolonged as a sutural line.

**C. pusillus** Lec.—Oblong, depressed, reddish brown to dark piceous, legs always ferruginous, beneath densely clothed with gray scales, above thinly clothed with pale, scattered scales, each elytral interspace with a row of erect, rigid setæ. Beak a little longer than the prothorax, cylindrical, feebly curved, finely carinate, punctured and striolate near the base, shining and remotely punctulate beyond the insertion of the antennæ, the latter inserted a little before the middle (♂ and ♀), slender, outer joints of funicle not wider, club large, ovoidal-acuminate Eyes flattened, only partially concealed by the feeble, prothoracic lobes. Head densely punctured, front slightly concave; prothorax wider than long, gradually narrowed from the base and feebly rounded on the sides, constricted at the apex, apical margin elevated, entire, lateral tubercles small, acute, dorsal channel entire, wider towards the base, disc densely punctured, each puncture bearing a short hair on seta, a line each side and along the middle, of pale scales; scutel very minute. Elytra oblong, a little wider at the base than the prothorax, scarcely narrowed for three-fourths their length, then rapidly rounded to the apex, sides very little rounded, striæ deep, closely punctured, interspaces a trifle convex, rugose, with a row of fine, equidistant, setigerous punctures, declivity with a few, very small, acute granules, an ill-defined scutellar spot of pale scales; pygidium small, convex (♂), or scarcely visible between the elytral apices (♀); femora feebly clavate, tibiæ a little widened towards the apex, tarsi very slender, third joint not broadly bilobed, fourth long, projecting more than the length of the third, claws armed with a long, acute tooth. Length 2.0 mm.; 0.08 inch.

♂. Ventral fovea profound, rounded.

*Hab.*—California.

Dr. Horn's, Nat. Mus. and my own coll. More closely related to *pauxillus* and *convexicollis*. It differs from *pauxillus* by its somewhat larger size, elongate, oblong form, more or less reddish brown color, from *convexicollis* by its more elongate form, less strongly rounded prothorax, hair-like setæ, and especially by the more elongate antennal club.

The scales on the upper surface are easily abraded, giving the insect a hirsute appearance.

**C. pauxillus** n. sp.—Oval, convex, dark piceous, tibiæ and tarsi paler, beneath clothed with dirt-colored scales, above sparsely clothed with pale scales, elytral interspaces with a row of stiff, suberect setæ. Beak feebly curved, not very slender, shining, finely punctured, striate and scaly towards the base; antennæ slender, inserted at the middle (♂), or immediately before it (♀), outer joints of funicle a little wider. Eyes covered about one-half in repose by the feeble prothoracic lobes. Head densely punctured, front flattened or a little concave, squamous; prothorax one-half wider than long, strongly narrowed in front, well rounded on the sides, apex broadly constricted, apical margin elevated, not emarginate, lateral tubercles rather large, acute, dorsal channel narrow, ill-defined, obsolete on the disc, the latter rather coarsely though not very closely punctured, base bi-emarginate; scutel visible. Elytra fully one-fourth wider at the base than the prothorax, a little longer than wide, narrowed behind, striæ wide, deep, very closely punctured, punctures small, interspaces convex, with a row of setigerous punctures; pygidium coarsely punctured;

femora feebly clavate, tibiæ a little wider towards the apex, tarsi stout, first joint a little longer, second short, third broadly bilobed, fourth projecting about the length of the preceding joint, claws armed with a long, acute tooth, almost bifid. Length 1.7 mm.; 0.07 inch.

♂. Ventral fovea ill-defined.

*Hab.*—New Mexico, N. Illinois. Mr. A. Bolter's and my own coll. The scales on the upper surface are easily rubbed off, giving the insect a very hirsute appearance, similar to *pusillus*. One of Mr. Bolter's specimens has the elytral interspaces more flattened and a scutellar spot of white scales.

**C. convexicollis** Lec. Pl. xiv, figs. 30*a*, 31*c*.—Oblong, pitchy black, legs rufo-piceous, above not densely clothed with large, pale, appressed scales, intermixed with a coarse, suberect, squamiform pubescence, underside not densely clothed with oval or elongate oval, grayish white scales, summit of mesosternal side pieces densely scaly. Beak curved, more or less shining, punctured throughout, more finely towards the apex, striolate and squamose near the base; antennæ inserted just before the middle (♂), or two-fifths from the base (♀), slender, outer joints of funicle wider, club large, oval, obtuse, the first joint forming one-half its mass. Eyes completely concealed in repose. Head densely punctured, scaly, front slightly concave; prothorax one-half wider than long, strongly rounded on the sides, constricted at the apex, base nearly two-fifths wider than the former, apical margin elevated, not emarginate, ocular lobes moderate, lateral tubercles small, acute, dorsal channel distinct, impressed, base bi-emarginate, surface coarsely punctured, a median line and one each side interrupted by the lateral tubercle, of white scales; scutel minute, glabrous. Elytra oblong, a little wider at the base than the prothorax, feebly rounded on the sides, slightly narrowed for three-fifths their length, then rapidly narrowed to the apex, striæ coarse, closely punctured, punctures more or less concealed by the scales, interspaces convex, roughened, finely muricate on the declivity, a scutellar spot, not well defined, of condensed scales; pygidium densely scaly, legs and tarsi slender, thinly pubescent, first two joints of tarsi somewhat elongate, third short, not broadly bilobed, fourth joint very long, equaling in length the two preceding joints; claws with a short, but acute, basal tooth. Length 2.0 2.5 mm.; 0.08–0.10 inch.

♂. Ventral fovea apical, transverse.

*Hab.*—Colorado, Idaho, Wyoming, New Mexico, Arizona, Utah, Texas.

Numerous specimens. Dr. LeConte describes the antennæ as testaceous, the elytral interspaces as finely alutaceous, these characters I have not found in any specimen; nevertheless, I have no doubt of this being the species described by that author as *convexicollis*.

The appearance of this species varies, according to the presence or absence of the large scales on the upper surface, similar to the two preceding species; from these, as well as all the other species of this group, it is distinguished by the short, obtuse, antennal club,

and the long fourth joint of the tarsi, the tooth of the claws is quite short, and the erect scales of the elytra are striate.

Var. *atomus*.—A small male specimen from Utah, in Mr. Ulke's collection, presents some differences, which, with more material, may prove this to be a distinct species. Beak longer, tapering from the base, front not impressed, prothorax more deeply constricted behind the apical margin, transverse impression in front more sharply limited, a little more coarsely punctured. Elytra wider at the base, alternate interspaces wider, squamiform pubescence semi-procumbent, pale ochreous, arranged in single or double rows, posterior callus with some quite distinct, acute tubercles. The large scales are more pearly white; an indistinct and interrupted sutural vitta. The specimen has an altogether smoother, scarcely hirsute appearance.

### squamatus group.

A small number of species comprise this group. They are characterized by the 7-jointed funicle of the antennæ, femora mutic and claws simple; they are of small size, and are distinguished as follows:

Above shining, finely pubescent with scattered larger scales.
  Scutellar spot of elongate, whitish scales.....**anthonomoides.**
  Scutellar spot and transverse fascia behind the middle of the elytra, of large, white oval scales.....**squamatus.**
Above, densely scaly or coarsely pubescent.
  Tarsi stouter, third joint broadly bilobed, lobes long, fourth joint not projecting more than the length of the third; anterior margin of prothorax emarginate, elytra without rows of acute granules. Pl. xiv, fig. 31.
    Oblong, apical cusps of prothorax acute; no elytral spots..**oregonensis.**
    Oval, anterior cusps indistinct, elytra with oblique spot and posterior fascia of condensed scales.....**siculus.**
  Tarsi long and slender, fourth joint of anterior tarsi projecting more than the length of the third; anterior margin of prothorax entire. Pl. xiv, fig. 31*a*.
    Larger, not shining above, scales large, intermixed with coarse pubescence. **persimilis.**
    Smaller, shining, above thinly clothed with long, white hair. **albopilosulus.**

**C. anthonomoides** n. sp.—Oval elliptic, black, antennæ and legs rufopiceous, above, shining, very thinly clothed with fine, whitish pubescence with a few suberect, whitish scales. Beak moderately slender, regularly and rather strongly curved, cylindrical, glabrous, striate and punctured from the base to the insertion of the antennæ, more remotely punctured towards the apex; antennæ rather stout, inserted a little beyond the middle (♂), club ovoidal. Head flattened, very coarsely punctured; prothorax more than one-half wider than long, one-third wider at the base than at the apex, convergently rounded on the sides, constricted at the apex, ocular lobes distinct, lateral tubercles small, acute, dorsal

channel entire, more deeply impressed before and behind, disc uniformly and not densely punctured, punctures moderately large; scutel not visible. Elytra a little wider at the base than the prothorax, humeri oblique, rounded on the sides, striæ impressed, closely and distinctly punctured, interspaces wider, flattened, rugulose, a conspicuous scutellar spot on the first and second interspaces of white scales; pygidium finely and subconfluently punctured; underside densely and coarsely punctured, mesosternum and side pieces densely, rest of surface less densely clothed with large, elongate scales, smaller on the abdomen. Legs somewhat robust, tibiæ a little widened towards the apex, tarsi moderate, first and second joints elongate, third broadly bilobed, fourth shorter than the two preceding joints together. Length 2.5 mm.; 0.10 inch.

♂. Last ventral segment with rounded fovea, middle and posterior tibiæ rather strongly unguiculate.

*Hab.*—District of Columbia.

A male specimen in Mr. Ulke's collection. This species resembles, somewhat, *Anthonomus flavicornis* Boh.

**C. squamatus** Lec.—Oval, robust, subdepressed, piceous, antennæ and legs rufo-piceous, underside clothed with grayish white scales, crowded on the sternal side pieces, above finely pubescent, scutellar spot and a transverse elytral fascia behind the middle of large, oval scales. Beak long and slender, evenly cylindrical, curved, finely punctured and striate towards the base, more shining towards the apex; antennæ inserted immediately before the middle, slender, funicle 7-jointed, first joint stout, second slender and shorter, joints 3–4 subequal, outer joints a little wider, club strongly elongate, about as long as joints 2–7 of funicle. Eyes almost entirely concealed in repose. Head convex, densely punctured, front slightly flattened; prothorax one-half wider than long, narrowed in front and deeply constricted at the apex, ocular lobes moderate, apical margin not strongly elevated, entire, lateral tubercles acute, dorsal channel entire, more deeply impressed and wider toward the base, less distinct at the middle, surface closely punctured, punctures rather small, sides and dorsal channel clothed with whitish scales; scutel evident. Elytra ovate, about one-quarter wider at the base than the prothorax, sides rounded and narrowed towards the apex, striæ wide, deep, closely and distinctly punctured, interspaces slightly convex, somewhat shining, rugose, finely muricate on the declivity, besides the scutellar spot and transverse fascia, there are some large, scattered scales, especially along the base; pygidium densely punctured. Legs moderate, femora mutic, subclavate, tibiæ parallel, a little wider at the apex, tarsi stout, third joint broadly bilobed, lobes long, fourth joint projecting much less than the length of the third; claws simple. Length 2.2–2.5 mm.; 0.09–0.10 inch.

♂. Last ventral segment with a deep, transverse, oval excavation; tibiæ not distinctly unguiculate.

*Hab.*—Iowa, Kentucky, Illinois.

Three specimens, all males, are before me. An easily recognized species.

**C. oregonensis** n. sp. Pl. xiv, fig. 31.—Oblong, pitchy black, legs rufous, underside densely clothed with dirt-colored scales, above not densely, with pale brown or grayish yellow, small, elongate scales. Beak not very slender, feebly

curved, shining, finely punctulate, striate and scaly towards the base; antennæ not slender, inserted before (♀) or at the middle (♂), funicle 7-jointed, first and second joints longer, joints 3-7 gradually shorter and wider, club ovoid, acuminate. Head closely punctured and scaly, front concave between the eyes; prothorax wider than long, two-fifths wider at the base than at the apex, rounded on the sides and broadly constricted at the apex, ocular lobes feeble, apical margin elevated, emarginate at the middle with a triangular cusp each side, lateral tubercles acute, dorsal channel narrow, impressed, subinterrupted at the middle, disc closely and rather coarsely punctured, each puncture bearing a coarse, scale-like hair, sides clothed witn pale scales; scutel minute. Elytra subtrapezoidal, less than one-third wider at the base than the prothorax, humeri oblique, prominent, feebly rounded on the sides and slightly narrowed posteriorly, declivity rather precipitous, muricate, striæ not deeply impressed, punctured, each puncture bearing a white elongate scale, interspaces flattened, rather wide, rugose, an irregular, scutellar spot of white scales; femora rather slender, subclavate, tibiæ somewhat compressed, widened towards the apex, tarsi stout, first and second joints not elongate, fourth projecting about the length of the third joint, claws stout, simple; pygidium finely punctured and squamous. Length 2.0 mm.; 0.08 inch.

♂. Last ventral segment with an ill-defined fovea and a tubercle-like elevation each side, middle and posterior tibiæ unguiculate, more distinctly on the middle pair.

*Hab.*—Portland, Oreg., Idaho (collected by F. H. Wickham). Dr. Horn's and my own collection. The two specimens from Idaho differ somewhat from the above description; upper surface more densely scaly, scales more yellowish and intermixed with white scales, the dorsal channel is wider and more deeply impressed.

**C. siculus** n. sp. Pl. xiv, fig. 27.—Oval, rather convex, blackish, antennæ and legs rufo-testaceous, beneath clothed with small, whitish or cream-colored scales, the latter especially on the sternal side pieces, above clothed with a fine, white or pale brown, squamiform pubescence intermixed with larger white scales. Beak rather stout, curved, scarcely as long as the prothorax (♂), finely carinate, punctured, striolate, pubescent throughout; antennæ slender, inserted two-fifths from the apex (♂), first two joints of funicle elongate, first joint stouter, outer joints scarcely wider, club large, elongate, pointed. Head densely punctured, coarsely pubescent, front flattened; prothorax wider than long, strongly narrowed in front, rounded on the sides and constricted at the apex, ocular lobes well developed, apical margin elevated, emarginate at the middle, lateral tubercles small, acute, dorsal sulcus entire, of equal width, not deeply impressed, basal margin straight, disc closely punctured, sides clothed with pale scales; scutel minute. Elytra scarcely longer than wide, more than one-fourth wider at the base than the prothorax, feebly rounded on the sides and gradually narrowed behind for three-fourths their length, then suddenly narrowud to the apex, striæ fine, punctures small, each bearing a white, piliform scale and more or less concealed by the scaly vestiture, interspaces slightly convex, rugulose, a few very small, acute granules on the summit of the declivity, the latter rather precipitous, an oblique spot extending from below the humerus on the ninth interspace to the sixth interspace inclusive, another spot near the base on the fourth, and another

on the base of the second interspaces, thus forming an interrupted line from the end of the oblique spot on the sixth to the basal spot on the second interspace, a short sutural line and a less distinct post-median fascia of white, piliform scales: anterior coxæ narrowly separated, femora and tibiæ slender, former mutic, the latter widened towards the apex, first joint of tarsi a little elongate, lobes of third rather long, fourth projecting less than the length of the third joint, claws very small, simple. Length 2.0-2.25 mm.; 0.08-0.09 inch.

♂. Fovea of last ventral segment transverse, oval, sharply limited, middle and posterior tibiæ distinctly unguiculate at the apex.

*Hab.*—District of Columbia, Virginia. Nat. Mus. and Mr. Ulke's collection. Two males.

This species is not unlike *C. obliquus* Lec., from which it differs by its 7-jointed antennal funicle and mutic femora. The two specimens differ considerable in appearance, the specimen in the National Museum is more densely scaly, has the scaly vestiture better preserved and the spots on the second and fourth elytral interspaces large and conspicuous, while the post-median band is evident only on the sides. Mr. Ulke's specimen has the oblique spot quite conspicuous and surrounded by a subglabrous space and the post-median fascia quite distinct, the spot on the fourth interspace is quite small. It seems that the yellowish scales are more easily abraded than the white scales, the former being almost absent in Mr. Ulke's specimens.

**C. persimilis** n. sp. Pl. xiv. fig. 31*a*.—Oblong, black, antennæ and legs paler, densely clothed beneath with grayish white scales, above with coarse, grayish, squamiform pubescence intermixed with white scales of various sizes. Beak a trifle longer than the prothorax (♀), cylindrical, curved, glabrous, remotely punctured, finely striate towards and scaly at the base: antennæ piceous, slender, inserted two-fifths from the base (♀), first two joints of funicle elongate, 3-4 short, equal, outer joints scarcely wider, club elliptic, acuminate. Head densely punctured and scaly, front flattened; prothorax a little wider than long, narrowed from the base, broadly rounded on its posterior two-thirds, broadly and deeply constricted behind the apical margin, the latter elevated, entire, a transverse ridge extending from the lateral tubercles towards the median line and limiting posteriorly a broad, transverse groove which occupies the anterior half of the prothorax, dorsal channel widened anteriorly, ocular lobes prominent, base feebly emarginate each side, disc closely punctured, punctures larger on the sides, the latter more densely clothed with pale scales; scutel small, distinct. Elytra less than one-fourth wider at the base than the prothorax, sides nearly straight and gradually narrowed for three-fourths their length, then obliquely narrowed to the apex, striæ impressed, punctured, more or less concealed by the scales, interspaces slightly convex, each with a row of very small, acute granules, which become larger and more evident on the declivity, a not well defined spot behind the scutellum of white scales; femora feebly clavate, piceous, mutic, tibiæ and tarsi rufo-piceous, the former subparallel, the latter slender, first and second joints elongate, compressed, third broadly bilobed, fourth long and slender, pro-

jecting more than the length of the preceding joint, claws small, simple. Length 2.0 mm.: 0.08 inch.

*Hab.*—Nevada.

A female specimen in Mr. Ulke's coll. It bears the label "*C. convexicollis* Lec.," to which, indeed, it bears a close resemblance, the prothorax, however, is less stongly rounded on the sides and the claws are simple.

**C. albopilosulus** n. sp.—Oblong oval, pitchy black, underside not densely clothed with elongate with scales, above very sparsely clothed with long, suberect, white, hair-like scales. Beak long and cylindrical, strongly curved, glabrous, remotely punctulate in its apical half, striate from base to middle, antennæ slender, inserted a little before the middle, first joint of funicle elongate, a little robust, joints 2–4 about equal, longer than wide, outer three joints transverse, gradually wider, club rather large, ovoidal, pointed. Head closely punctured, pubescent, front flattened with concentric rows of punctures; prothorax a little wider than long, two-fifths wider at the base than at the apex, widest before the middle, strongly rounded on the sides and deeply constricted behind the apical margin, a narrow impressed line before the basal margin, giving a somewhat constricted appearance, broadly impressed in front, lateral tubercles rather large, prominent, acute, a row of small, acute granules extending from the lateral tubercles towards the median line and a few small granules exterior to the tubercles, an acute tubercle each side of the dorsal channel, the latter subinterrupted before the middle, impressed in the form of a round, deep fovea behind the apical margin, the latter strongly elevated, entire, ocular lobes nearly obsolete, base feebly emarginate each side; scutel evident, glabrous. Elytra one-fourth wider at the base than the prothorax, subquadrate, a trifle longer than wide, finely striate and punctured, punctures rather small, interspaces wide, somewhat shining, each with a row of acute granules which become larger and tuberculiform towards the declivity, a short, ill-defined line of white scales behind the scutel; femora clavate, tibiæ subparallel, a little wider towards the apex, tarsi slender, third joint broadly bilobed, fourth long and slender, projecting decidedly more than the length of the third joint, claws simple, rather long and slender, widely divergent. Length 1.75 mm.; 0.07 inch.

*Hab.*—Los Angeles, Cal.

A female specimen in the National Museum coll. A very distinct species; its nearest ally is *persimilis*, from which it differs by its smaller size, long and sparse pubescence, obsolete prothoracic lobes and the row of acute granules on the prothorax; the granules on the elytral interspaces are larger.

### septentrionis group.

The species belonging to this group are all small in size and are readily distinguished from those of the preceding groups by the 6-jointed funicle of the antennæ, the unarmed femora and the simple claws; joints 1–3 of the antennal funicle elongate, the outer three

joints short, club variable. The middle and posterior tibiæ are unguiculate in the males, simple in the females. They are distinguished as follows:

Elytral with sutural vitta. Pl. xiv, figs. 28, 29.
  Elytra black, shining, apical part rufous, a white lateral spot...**semirufus.**
  Elytra brown, pubescent.....**medialis.**
Elytra without sutural vitta, at most a scutellar spot or line of pale scales.
  Above clothed with fine pubescence, more or less shining.
    Larger, 2.0 mm. or more, prothorax finely and evenly punctured.
      Legs red, fourth tarsal joint long.....**erythropus.**
      Legs blackish, fourth tarsal joint shorter.....**murosus.**
    Very small, less than 2.0 mm., prothorax coarsley and not evenly punctured. **atriculus.**
  Dark, blackish, above coarsely pubescent.
    Larger, antennæ of male inserted beyond the middle, pubescence more appressed.....**septentrionis.**
    Smaller, antennæ of male inverted before the middle, pubescence less appressed.....**puberulus.**
Elytra and legs brownish red, squamous above.....**zimmermanni.**

**C. semirufus** Lec. Pl. xiv, fig. 28.—Oval elliptic, nigro-piceous, apical half of elytra and legs ferruginous, shining, above very thinly clothed with short, fine pubescence and large, scattered scales, sutural vitta and lateral spot of the elytra of large white scales, underside densely clothed with similar scales. Beak curved, tapering from the base, subcarinate and striate each side in its basal half, shining and remotely punctured towards the apex; antennæ inserted immediately before (♀), or at the middle (♂), first two-joints of funicle long, about equal, third shorter, outer joints wider, club ovoid. Head coarsely and closely punctured; prothorax wider than long, fully one-third wider at the base than at the apex, the latter broadly and strongly constricted, sides rounded, rather suddenly narrowed in front, ocular lobes prominent, apical margin elevated, entire, fuscous, lateral tubercles transverse, acute, distinct, sides deeply impressed in front of the tubercles, dorsal channel deeply impressed in front and near the base, almost interrupted at the middle, disc rather coarsely but not closely punctured, sides and channel densely clothed with yellowish white scales; scutel minute, glabrous. Elytra less than one-third wider at the base than at the prothorax, longer than wide, broadly rounded on the sides and gradually narrowed from humerus to apex, striæ rather wide, impressed, distinctly and closely punctured, interspaces flattened, shining, slightly rugulose and finely punctulate, declivity with a few very minute, acute granules; pygidium densely punctured; femora feebly clavate, mutic, tibiæ subparallel, wider towards the apex, tarsi stout, second joint short, lobes of third joint rather long, fourth not long, projecting less than the length of the preceding joint, claws slender, simple. Length 2.0 mm.; 0.08 inch.

♂. Last ventral segment impressed, impression limited each side by ridges converging towards the apex.

*Hab.*—Buffalo (New York), Canada, Detroit (Michigan).

Distinct and easily recognized by the ferruginous apical half of

the elytra, conspicuous white sutural vitta and lateral spot. Dr. LeConte gives the size as 1.3 mm. The eight specimens before me show no difference in the measurement given above. This author's reference to the supposed relationship of the present species to the European *C. querceti* Gyll.* is erroneous, the latter species is larger, antennal funicle 7-jointed, the vestiture consists of a coarse pubescence without sutural vitta or lateral spot of the elytra, the latter are rufous at the apex, the only approach to similarity I can find.

**C. medialis** Lec. Pl. xiv. fig. 29.—Oblong oval, brownish piceous, above clothed with pale, scale-like pubescence, sutural interspace and base of second interspace densely, sides behind the middle of the elytra, less densely clothed with dirty white scales, underside densely clothed with similar scales. Beak slender, curved, finely punctured, nearly smooth towards the apex, finely striate each side towards the base, the latter scaly; antennæ slender, inserted two-fifths from the base (♂), joints 1-3 of funicle long and slender, outer joints wider, club elliptic pointed. Head densely punctured and scaly: prothorax wider than long, one-third wider at the base than at the apex, feebly and convergently rounded on the sides behind, rather suddenly narrowed in front and broadly constricted at the apex, ocular lobes distinct, lateral tubercles small, acute, dorsal sulcus entire, more deeply impressed near the base, surface finely and not very closely punctured, basal margin straight each side; scutel minute, scaly. Elytra a little wider at the base than the prothorax, longer than wide, sides nearly straight and narrowed behind for three-fourths their length, then obliquely narrowed to the apex, posterior callus obvious, muricate, striæ well impressed, closely punctured, punctures more or less concealed by the pubescence, interspaces flattened, rugose; pygidium closely punctured and scaly. Legs, tarsi and claws as in *semirufus*. Length 2.4 mm.; 0.09 inch.

♂. Last ventral segment with deeply impressed apical fovea, limited each side by an oblique acute ridge.

*Hab.*—Louisiana: Bayou Sara and New Orleans; Lake Superior (LeConte).

A male specimen in Dr. Horn's coll. and four in Nat. Mus. coll. are before me, and agrees in all particulars with Dr. LeConte's description except that the prothoracic lobes are quite distinct, and the prothorax is not strongly punctured.

**C. erythropus** n. sp.—Oblong oval, blackish, legs reddish brown, above clothed with a fine pubescence, consisting of short, suberect, hair-like scales, and having a faint, brassy lustre. Beak long, curved, somewhat tapering from the base to the apex, striate and punctured in its basal half, shining, finely punctured and striolate towards the apex; antennæ slender, inserted a little beyond the middle (♀), joints 1-2 of funicle elongate, the former a little more robust, joints 3-6 gradually shorter, scarcely wider towards the clava, the latter elongate acuminate. Head finely and very closely punctured; prothorax more than

* Proc. Amer. Philos. Soc. xv, p. 279.

one-half wider than long, one-third wider at the base than at the apex, well rounded on the sides and strongly constricted at the apex, ocular lobes broad, not prominent, apical margin not much elevated, lateral tubercles somewhat transverse, small, acute, channel linear, interrupted at the middle, superficial, except at the base, disc evenly and rather finely punctured, basal margin nearly straight each side; scutel scarcely visible. Elytra one-fourth wider at the base than the prothorax, longer than wide, feebly rounded on the sides, the latter subparallel for three-fourths their length, then obliquely rounded to the apex, striæ fine, punctures not closely approximate, interspaces flattened, rugose, posterior callus with a few very minute, acute granules; pygidium closely punctured, underside not densely clothed with small, whitish scales; femora slender, mutic, tibiæ subparallel, a little wider towards the apex, tarsi rather slender, first two joints a little elongate, third broadly bilobed, lobes long, fourth joint slender, projecting about the length of the preceding joint, claws simple, slender, divergent. Length 2.0 mm.; 0.08 inch.

*Hab.*—District of Columbia.

A female specimen in Mr. Ulke's coll., closely related to the next. The insertion of the antennæ beyond the middle of the rostrum in the female is worthy of note.

**C. morosus** n. sp.—Very closely resembles *rufipes*, with which it agrees in all particulars, except the following: Black, tibiæ and tarsi piceous, antennæ reddish brown, inserted two-fifths from the base (♀), joints 1–3 of funicle elongate, slender, 4–6 short; prothorax very densely punctured in its basal half. Elytra shining; tibiæ slender, parallel, not at all widened to the apex, fourth tarsal joint shorter, projecting less than the length of the third joint. Length 2.25 mm.; 0.09 inch.

*Hab.*—Virginia.

A female specimen in Mr. Bolter's coll. It is with some hesitation that I consider this as distinct from *erythropus*. The single specimen is very much abraded, but what is left of the pubescence would seem to indicate that it is finer than in *rufipes*, the hair-like scales are bistriate under high amplication, a character not observed in *rufipes*. The difference in the insertion of antennæ is very marked, both type specimens being females, likewise the relative length of the fourth tarsal joint.

**C. atricnlus** n. sp.—Oblong oval, black, antennæ testaceous, very thinly clothed with a fine, scale-like pubescence, scales a little larger on the underside than above. Beak slender, cylindrical, regularly curved, finely striate and punctured towards the base, somewhat shining and more remotely punctulate towards the apex; antennæ slender, inserted at the middle, funicle 6-jointed, first joint more robust, second a little longer than the third, clava rather large, oval elliptic, dusky. Head rather wider, feebly convex, very closely punctured; prothorax a little wider than long, broadly rounded on the sides, rather broadly, but not strongly constricted at the apex, apical margin somewhat elevated, entire, lateral tubercles small, acute, base biemarginate, dorsal channel obscure, more evident

anteriorly, surface closely and somewhat coarsely punctured; scutel minute. Elytra oblong, about one-fourth wider at the base than the prothorax, sides nearly parallel, feebly rounded; striæ well impressed, distinctly and rather closely punctured, interspaces moderately wide, outer ones a little more convex, rugulose. Legs slender, femora scarcely clavate, tibiæ a little widened towards the apex, tarsi a trifle compressed, third joint broadly bilobed, lobes rather long, fourth joint projecting about the length of the preceding joint. Length 1.75 mm.; 0.07 inch.

*Hab.*—Pennsylvania.

A female specimen of this very small species in Mr. Ulke's coll.

**C. septentrionis** Gyll.—Oblong oval, black, antennæ rufo-testaceous, legs piceous, above clothed with a pale, coarse pubescence, scales striolate and having a faint, metallic lustre, underside more densely clothed with small, oval, or elongate, dirty white scales. Beak long, curved and cylindrical, striate and punctured from the base to the insertion of the antennæ, shining and finely punctured towards the apex; antennæ slender, inserted a little beyond the middle (♂), or two-fifths from the base (♀), joints 1-3 of funicle elongate, three outer joints short, gradually wider, club elliptic, pointed. Head rather coarsely punctured and coarsely pubescent; prothorax a little wider than long, narrowed in front, well rounded on the sides and strongly constricted at the apex, the constriction narrow on the sides, extending backward and becoming wider above, ocular lobes broad, feeble, apical margin not much elevated, entire, lateral tubercles small, dorsal channel foveiform in front and at the base, nearly obsolete at the middle, surface closely and rather coarsely punctured, each puncture bearing a coarse and scale-like hair: scutel small, glabrous. Elytra longer than wide, about one-fourth wider at the base than the prothorax, sides broadly rounded from humerus to apex, posterior callus not very evident, declivity very finely muricate, striæ impressed, punctures small, not approximate, interspaces flattened, rugose, scales arranged in two or three irregular rows, an inconspicuous scutellar spot of pale scales; pygidium very coarsely punctured, femora clavate, mutic, tibiæ widened towards the apex, tarsi rather slender, first two joints elongate, third broadly bilobed, fourth projecting less than the length of the third joint, claws simple, slender and rather approximate. Length 2.0-2.25 mm.; 0.08-0.09 inch.

♂. Last ventral segment with a broadly oval fovea occupying the middle two-fourths of the segment.

*Hab.*—New York, New Jersey, Virginia, Illinois.

Closely related to the next species. The scutellar spot is entirely absent in some specimens.

**C. puberulus** Lec.—Resembles *septentrionis*, from which it differs as follows: The scale-like pubescence is less appressed, the beak longer and more slender, especially in the female, thoracic channel more evenly impressed, not interrupted at the middle; the antennæ of the male are inserted before the middle: the scutellar spot of the elytra is more distinct and the pygidium more finely punctured. It is a trifle smaller.

♂. Last ventral segment with a fovea occupying the middle third of the segment, a tubercle-like elevation each side of the fovea.

*Hab.*—Pennsylvania, Wisconsin, Michigan, Texas; Alameda County, California.

But for the difference in the insertion of the antennæ and the formation of the ventral fovea in the male, a specific differentiation from *septentrionis* would not be tenable. The California specimens are a little longer than the eastern, and agree in size with the preceding species.

**C. zimmermanni** Gyll.—Oblong, elliptic, piceous: beak, antennæ, elytra and legs reddish brown, above thinly clothed with white, oval scales, intermixed with a suberect, squamiform pubescence, underside densely clothed with whitish scales. Beak cylindrical, slender, curved, striate each side from the base to the insertion of the antennæ, shining and finely punctured beyond, a little stouter at the base and tapering towards the apex in the female; antennæ inserted about two-fifths from the apex (♂), or just beyond the middle (♀), first two joints of funicle elongate, joints 3–4 a little shorter, subequal, outer two joints wider, club elliptic, pointed. Head closely punctured, front flattened, thinly scaly; prothorax wider than long, narrowed in front, rounded on the sides and broadly constricted at the apex, ocular lobes prominent, apical margin elevated, entire, lateral tubercles very small, acute, dorsal channel feebly impressed, more distinct at the base, surface closely and rather coarsely punctured, coarsely pubescent; scutel minute, scaly. Elytra oblong, a little wider at the base than the prothorax, slightly narrowed from the humerus for three-fourths their length then obliquely to the apex, posterior callus rather distinct, finely muricate, striæ impressed, distinctly punctured, interspaces shining, rugulose: pygidium densely and finely punctured, a scutellar spot, not well defined, of pale scales; femora feebly clavate, tibiæ scarcely widened towards the apex, tarsi stout, first two joints not elongate, third not broadly bilobed, fourth slender and projecting about the length of the preceding joint, claws simple, slender. Length 1.75 mm.; 0.07 inch.

♂. Last ventral segment with a rounded or oval, not sharply defined fovea.

*Hab.*—Eastern and Western States.

Easily recognized by its small size and pale brownish color. The difference in the beak, as well as in the insertion of the antennæ in the two sexes, is worthy of note.

## RILEYONYMUS gen. nov.

Beak long and slender, tapering, antennæ slender, funicle 7-jointed, club short, ovoidal, acuminate. Eyes small, surmounted by a lateral expansion of the front and scarcely visible from above; front broadly concave, expanded laterally into a triangular projection, occiput more narrowly concave and separated from the frontal excavation by a not very obvious transverse ridge; prothorax wider than long, strongly and sharply narrowed in front, ocular lobes large, prominent, apical margin elevated, lateral tubercles prominent, obtuse, basal margin deeply bisinuate; scutel not visible. Elytra longer

than wide, alternate interspaces wider, with tufts of elevated scales; prosternum long in front of the coxæ, narrowly and deeply emarginate, ante-coxal ridges acute; mesosternum depressed between the coxæ, transversely sulcate; metasternum shorter than the first ventral segment; first and second ventral segments longer than the three following, separated by a straight suture, segments 3–5 equal; anterior coxæ prominent, rather narrowly separated, middle coxæ more widely separated, not enclosed within by the coxal cavities; femora toothed, tibiæ widened to the tip, tarsi narrow, third joint scarcely wider than the others, claws approximate at the base, simple.

A very peculiar insect forms the type of this genus. The mesosternum being depressed between the coxæ gives a deceptive appearance of being canaliculate and forming part of the pectoral canal. The broadly excavate and expanded front, the equal length of the three last ventral segments and the narrow tarsi, form a complex of characters which does not permit the reception of the single species into the old genus *Ceutorhynchus*. It is from a profound regard to the memory of that eminent and lamented scientist, Prof. C. V. Riley, that I dedicate this genus to his name.

Represented by a single species.

**R. relictus** n. sp. Pl. xiv, figs. 32, 32*a*, 32*b*.—Oblong elliptic, dark piceous, above densely clothed with large, imbricate scales, varying in color from pale ochreous to dark brown, underside clothed with dirty ochreous, densely matted scales. Beak curved in its basal half, shining, finely punctured, striate near the base; antennæ slender, inserted two-fifths from the base (♀), scape not attaining the eye, funicle 7-jointed, first joint stout, outer joints gradually decreasing in length, concavities of the head densely clothed with pale scales, frontal excavation with a longitudinal, ridge-like elevation; prothorax about one-half wider than long, sides straight for two-fifths their length and slightly convergent, then rapidly narrowed in front, apex broadly and strongly constricted, profoundly impressed about one-third behind the anterior margin, the latter strongly elevated, deeply and narrowly emarginate at the middle, ocular lobes prominent, a transverse ridge extending from the prominent, but obtuse, lateral tubercles across the disc, semi-interrupted by the dorsal channel and bearing several acute denticles each side, disc in front of this ridge precipitous, dorsal channel profound, entire, narrowed from the middle both towards the apex and the base, punctures concealed by the scaly vestiture, the latter intermixed with erect, blackish claviform scales, directed forward, a median line and one each side of pale scales. Elytra nearly one-third wider at the base than the prothorax, humeri rounded, prominent, sides nearly straight from the humeral prominence for three-fourths their length, then rapidly rounded to the apex, striæ impressed, sculpture completely concealed by the scales, interspaces alternately wider, convex, the dark brown velvety scales erect, forming elongated spots on the wider interspaces, alternating with pale spots of appressed scales, each interspace with a row of dark brown, erect

setæ, a velvety spot one-fourth from the base on the first and second interspaces, a little prolonged on the sutural interspace; posterior callus rather prominent; pygidium densely scaly, underside closely and not coarsely punctured; femora rather slender, with a large, acutely triangular tooth, tibiæ not long, distinctly widened from the base to the apex, outer apical angle rounded, tarsi narrow, first two joints elongate, third short, not bilobed, fourth as long as the two preceding joints together, claws approximate and subangulate near the base, not toothed. Length 3.0 mm.; 0.12 inch.

*Hab.*—"Panamins, Vy., K."

A female specimen with the above locality label in the Nat. Mus. collection.

## Subtribe *Phytobii.*

This subtribe contains those genera in which the pectoral canal is either entirely absent or, if present, becomes effaced between the anterior coxæ. The beak is short and stout, rarely *Cœlogaster*, *Phytobius*) more elongate. The eyes are not concealed in repose, and the prothoracic lobes are obsolete (except *Cœlogaster*). The species are all stout, robust insects, rarely elongate (*Perenthes*).

According to the formation of the beak and the presence or absence of prothoracic lobes, I have arranged the genera under two groups:

Beak elongate, less robust; scrobes parallel, directed against the eyes; eyes completely concealed in repose by prominent prothoracic lobes; claws bifid. Pl. xiv, fig. 33*a*.....Group I. **Phytobii spurii.**

Beak short, stout, scrobes oblique, directed beneath the eyes; eyes entirely or partially free, postocular lobes of prothorax feeble or obsolete. Pl. xiv, fig. 37. Group II. **Phytobii veri.**

### Group I. Phytobii spurii.

Aside from the characters given above nothing more need be said in the definition of this group, which is represented by the single genus *Cœlogaster*.

### CÆLOGASTER Schoen.

Beak moderately stout, as long as (♂) or a little longer (♀) than the prothorax, cylindrical, curved, somewhat widened at the apex in the female, scrobes parallel, expanded towards the eyes, antennæ slender, inserted two-fifths from the apex (♂) or at the middle (♀), funicle 6-jointed, joints 1–3 elongate, the first stouter, outer three joints short, gradually wider and merging into the elongate elliptical clava. Eyes rounded, convex, with acutely elevated orbital ridges completely concealed in repose; prothorax wider than long, narrowed in front, ocular lobes prominent, anterior margin emarginate,

bicuspid, lateral tubercles large, acute, base bi-emarginate; scutel small, glabrous. Elytra much and rather suddenly wider at the base than the prothorax, narrowed posteriorly; pygidium large, nearly perpendicular; pectoral canal deep, not extending upon the mesosternum, the latter truncate between the middle coxæ and entering less than one-half into the formation of the middle coxal cavities, side pieces wide, distinctly visible from above; metasternum truncate in front and behind; second abdominal segment shorter than the two following segments together, prolonged on the sides, third narrowed at its extremities, narrowly attainly the lateral margin; anterior coxæ conical, rather widely separated, middle coxæ glabrous, separated about one-half more than the anterior coxæ; posterior coxæ widely separated. Legs moderately long, femora not robust, mutic, tibiæ slender, tarsi moderate, third joint broadly bilobed, fourth joint short, claws armed with a slender tooth, almost as long as the claw itself.

In the formation of the beak, the presence of post-ocular lobes, completely concealing the eyes in repose, formation of the ventral segments and the bifid claws, this genus strongly reverts to *Auleutes* of the subtribe *Cœliodes*.

Two species, well defined by structural differences, occurs in our fauna:

Larger, ante-coxal ridges distinct, curved, dorsal channel of prothorax entire, a callous elevation each side at the middle. Pl. xiv, fig. 33*b*. **zimmermanni.**

Smaller, ante-coxal ridges obsolete, prosternum very deeply emarginate, sides of emargination straight; prothorax not uneven, channel interrupted at the middle. Pl. xiv, fig. 34*b*. ..... **lituratus.**

**C. zimmermanni** Gyll. Pl. xiv, figs. 33, 33*a*, 33*b*.—Broadly oval, piceous; antennæ, tibiæ and tarsi rufous, above variegated with spots of white, or yellowish white scales, underside densely scaly, scales large, oval, white. Beak obscurely subcarinate, opake, striate and punctured, thinly pubescent, except at the apex, which is glabrous, especially in the female. Head densely punctured; occiput, a spot above each eye and at the middle of the front, of white scales; prothorax not much wider than long, sides nearly straight behind, rounded in front, broadly but not deeply constricted at the apex, broadly impressed in front, apical cusps well marked, triangular, lateral tubercles acute, dorsal channel distinct, entire, gradually becoming wider from the base to the apical margin, an obtuse callosity each side of channel before the middle; between this callosity and the lateral tubercles there is a deep oblique sulcus, surface densely but not coarsely punctured, sides and anterior impression densely, dorsal channel less densely, clothed with large white scale. Elytra one-third wider at the base than the prothorax, wider than long, humeri rounded, sides feebly rounded and narrowed posteriorly,

[illegible]

**Hab.**—[illegible]

[illegible]

[illegible]

**Hab.**—[illegible]

Two female specimens. Mr. [illegible] species very closely resembles [illegible] rangement of the elytral spots [illegible] form of rostrum and the scutellum [illegible] thorax less prominent and [illegible] The cruciform spot of the elytra is absent [illegible] and represented by the basal spot of the third interspace only.

Group II. Phytodectes.

The genera and species comprising the *Phytodecta* [illegible] appearance peculiarly their own. The eyes are more or less prominent and not or only partially concealed in repose. The beak [illegible] and short, rarely slightly elongate (*Phytodecta*), sometimes oblique directed beneath the eyes.

bicuspid, lateral tubercles large, acute, base bi-emarginate; scutel small, glabrous. Elytra much and rather suddenly wider at the base than the prothorax, narrowed posteriorly; pygidium large, nearly perpendicular; pectoral canal deep, not extending upon the mesosternum, the latter truncate between the middle coxæ and entering less than one-half into the formation of the middle coxal cavities, side pieces wide, distinctly visible from above; metasternum truncate in front and behind; second abdominal segment shorter than the two following segments together, prolonged on the sides, third narrowed at its extremities, narrowly attainly the lateral margin; anterior coxæ conical, rather widely separated, middle coxæ glabrous, separated about one-half more than the anterior coxæ; posterior coxæ widely separated. Legs moderately long, femora not robust, mutic, tibiæ slender, tarsi moderate, third joint broadly bilobed, fourth joint short, claws armed with a slender tooth, almost as long as the claw itself.

In the formation of the beak, the presence of post-ocular lobes, completely concealing the eyes in repose, formation of the ventral segments and the bifid claws, this genus strongly reverts to *Auleutes* of the subtribe *Cœliodes*.

Two species, well defined by structural differences, occurs in our fauna:

Larger, ante-coxal ridges distinct, curved, dorsal channel of prothorax entire, a callous elevation each side at the middle. Pl. xiv, fig. 33*b*. **zimmermanni.**

Smaller, ante-coxal ridges obsolete, prosternum very deeply emarginate, sides of emargination straight; prothorax not uneven, channel interrupted at the middle. Pl. xiv, fig. 34*b*. ..... **lituratus.**

**C. zimmermanni** Gyll. Pl. xiv, figs. 33, 33*a*, 33*b*.—Broadly oval, piceous; antennæ, tibiæ and tarsi rufous, above variegated with spots of white, or yellowish white scales, underside densely scaly, scales large, oval, white. Beak obscurely subcarinate, opake, striate and punctured, thinly pubescent, except at the apex, which is glabrous, especially in the female. Head densely punctured; occiput, a spot above each eye and at the middle of the front, of white scales; prothorax not much wider than long, sides nearly straight behind, rounded in front, broadly but not deeply constricted at the apex, broadly impressed in front, apical cusps well marked, triangular, lateral tubercles acute, dorsal channel distinct, entire, gradually becoming wider from the base to the apical margin, an obtuse callosity each side of channel before the middle; between this callosity and the lateral tubercles there is a deep oblique sulcus, surface densely but not coarsely punctured, sides and anterior impression densely, dorsal channel less densely, clothed with large white scale. Elytra one-third wider at the base than the prothorax, wider than long, humeri rounded, sides feebly rounded and narrowed posteriorly,

striæ fine, punctures very small, approximate, interspaces flattened, alternately a little more convex and more prominent, rugulose, a cruciform scutellar spot and a curved line each side, of condensed white, or yellowish scales, rest of surface less conspicuously mottled; pygidium densely punctured; prosternum deeply and rather widely emarginate, emargination limited by ante-coxal ridges, which are curved outwardly and more approximate at the apex; underside of body densely punctured and scaly throughout; femora annulate with white scales. Length 3.0 mm.: 0.12 inch.

♂. Last ventral segment with a large, oval, not deeply impressed fovea.

*Hab.*—New York, Illinois, Washington (Tacoma), South Carolina, Georgia, Pennsylvania.

This would seem to indicate its occurrence over the whole Atlantic slope, except the Northern States. A specimen in my coll. from Tacoma, Wash., has the elytral interspaces equal; the white elytral markings are easily abraded.

**C. lituratus** n. sp. Pl. xiv, figs. 34, 34*a*, 34*b*.—Very similar in appearance, less robust, and a trifle smaller than the preceding species, and with which it also agrees in coloration and the scaly vestiture. It differs as follows: Prothorax fully one-fourth wider than long, sides straight and parallel in their basal half, feebly rounded in front, narrowly and not distinctly constricted at the apex, scarcely impressed before the middle, tubercles and apical cusps smaller, without tuberosity each side of the dorsal channel, the latter almost interrupted at the middle. Elytral interspaces equal, the cruciform scutellar spot differs in that the transverse bar is somewhat oblique; a spot on the seventh interspace represents the oblique lateral line of the preceding species, another spot on the third interspace near the apex; prosternum very deeply and less widely emarginate, sides of the emargination straight, parallel, without ante-coxal ridges; pectus densely clothed with large white scales. Abdomen less densely clothed with piliform scales. Legs as in *zimmermanni*, but more slender. Length 2.75 mm.; 0.11 inch.

*Hab.*—Detroit, Mich., Illinois.

Two female specimens, Mr. Ulke's and my own collection. This species very closely resembles *Perigaster obscurus* in form and arrangement of the elytral spots, but aside from the difference in the form of rostrum and the scrobes has the anterior cusps of the prothorax less prominent and the last joint of the tarsi less elongate. The cruciform spot on the elytra is absent in Mr. Ulke's specimen and represented by the basal spot in the third interspace only.

### Group II. Phytobii veri.

The genera and species comprising the *Phytobii veri* present an appearance peculiarly their own. The eyes are more or less prominent and not or only partially concealed in repose. The beak stout and short, rarely slightly elongate (*Phytobius*), scrobes oblique, directed beneath the eyes.

The following genera are indicated:

Third tarsal joint bilobed, fourth joint shorter than the two preceding joints combined.

Second ventral segment as long as the following two segments together, third segment narrowed on the sides, not widely attaining the lateral margin; anterior coxæ more widely separated, fully one-half the distance of the middle coxæ.

Very robust form, lateral tubercles of prothorax very distinct, third tarsal joint broadly bilobed ..... **Perigaster.**

More elongate, thoracic tubercles almost obsolete, third tarsal joint scarcely bilobed ..... **Parenthis.**

Second ventral segment longer than the two following segments, third not narrowed on the sides, fully attaining the lateral margin; anterior coxæ narrowly separated, scarcely more than one-third the distance of the middle coxæ (except *Rhinoncus*).

Prosternum without ante-coxal ridges ..... **Pelenomus.**

Prosternum with ante-coxal ridges.

Eyes with distinct supra-orbital ridges, anterior coxæ separated one-third the distance of the middle coxæ ..... **Mecopeltus.**

Eyes without supra-orbital ridges, anterior coxæ separated one-half the distance of the middle coxæ ..... **Rhinoncus.**

Third joint of tarsi narrow, fourth as long as the preceding joints. Pl. xiv, fig. 40. **Phytobius.**

## PERIGASTER gen. nov.

Under this generic name I have separated the two species described by Dr. LeConte under *Cœlogaster*, and is thus characterized: Beak stout, shorter than the prothorax, widened towards the apex, scrobes linear, oblique; antennæ inserted one-third (♂), or two-fifths (♀) with 6-jointed funicle, joints 1–3 longer. Eyes large, round, moderately convex, partially concealed in repose, with acutely elevated orbital margin; prothorax strongly narrowed in front, ocular lobes obsolete, apical margin bicuspid, lateral tubercles present, basal margin nearly straight each side; scutel very small. Elytra wider at the base than the prothorax, broadly oval; pygidium nearly perpendicular; prosternum rather short and deeply emarginate in front of the coxæ, not canaliculate, mesosternum short, feebly emarginate in front, truncate behind and forming less than one-half of the middle coxal cavities; metasternum long, entering well between the middle coxæ; second abdominal segment shorter than the two following segments together, the third narrowed on the sides; anterior coxæ conical, prominent, rather widely separated, middle coxæ small, globular, separated twice the distance of the anterior coxæ and less than half the distance of the posterior. Legs slender, femora mutic, scarcely

clavate, tibiæ very slender, not armed at the apex, tarsi with the third joint broadly bilobed, claws simple, divaricate.

Thus defined this genus is readily distinguished from *Cœlogaster* by the stout and shorter beak, the oblique scrobes, obsolete post-ocular lobes and simple claws. From the following genus it is distinguished by its short, robust form, the distinct prothoracic tubercles and the broadly bilobed third tarsal joint. From the rest of the genera of this subtribe, the present genus is separated by the shorter second abdominal segment and the third segment narrowed on the sides.

The two species are distinguished thus:

Larger, prothorax impressed at the base, elytra not conspicuously mottled. **cretura.**

Smaller, prothorax channeled, carinate near the base, elytra tessellate, a conspicuous white spot on the third interspace.....**obscurus.**

**P. cretura** Herbst.—Broadly oval, brownish black, antennæ and legs reddish brown, thinly clothed above with small, pale, or brownish scales, variable in form, without mottling; beneath, pectus, first and second ventral segments and sides of prothorax, densely clothed with pale brown or fulvous scales, last three abdominal segments less densely scaly. Beak subcarinate, punctured, somewhat shining and like the head, thinly pubescent, the latter densely punctured, front broadly impressed; prothorax one-half wider than long, narrowed from the base, rounded on the sides, narrowly and feebly constricted at the apex, dorsal channel obsolete, a fovea-like impression in front of the scutel, lateral tubercles and apical cusps distinct, acute, surface densely and rather finely punctured. Elytra about one-fourth wider at the base than the prothorax, rounded on the sides, not obviously narrowed behind, striæ impressed, wide, punctured, punctures concealed by fine, piliform scales, interspaces convex, equal, finely rugose; pygidium rather coarsely punctured, underside densely punctured. Length 2.5–3.0 mm.; 0.10–0.12 inch.

♂. Ventral segments not impressed.

*Hab.*—Middle, Western and Southern States.

The thighs and tibiæ are infuscate about the middle in some specimens, entirely rufo-testaceous in others.

**P. obscurus** Lec. Pl. xiv, fig. 36.—Broadly oval, dark piceous, antennæ and legs rufo-testaceous, above thinly squamous, scales on the underside larger, more condensed, especially on the sternal side pieces. Beak very robust, finely striolato-punctate, clothed with fine pubescence. Head rather strongly and closely punctured, frontal fovea distinct, more densely scaly near the base of the rostrum and on the occiput, scales yellowish; prothorax one-half wider than long and about one-third wider at the base than at the apex, feebly rounded on the sides, basal margin straight each side, lateral tubercles acute, apical cusps acute, rather remote, flanks separated from the dorsum by an outwardly curved line or margin, extending from the lateral tubercles to the apical cusps, dorsal channel entire, less distinct at the middle, carinate at the base, disc densely and

coarsely punctured, each puncture bearing a fine, scale-like hair, flanks densely clothed with larger, yellowish scales. Elytra one-third wider at the base than the prothorax, about as long as wide, broadly rounded on the sides and not obviously narrowed behind, basal margin elevated, deeply striate, striæ nearly as wide as the interspaces, closely and coarsely punctured, interspaces convex, somewhat shining, indistinctly mottled with fine white scales, a conspicuous white spot of condensed scales on the third interspace a little more than one-fourth from the base, and another near the apex, a less conspicuous spot on the seventh interspace, about two-fifths from the base; pygidium coarsely punctured, punctures not crowded, underside coarsely punctured, less densely on the abdomen: femora infuscate about the middle, annulate with white scales. Length 2.5–2.75 mm.; 0.10–0.11 inch.

♂. Last ventral segment of male not impressed.

*Hab.*—Florida, Georgia.

Two specimens, Dr. Horn's and Mr. Ulke's coll. The resemblance of this species to *Cœlogaster lituratus* has been mentioned under that species; it is much less mottled with pale scales.

**PERENTHIS** gen. nov.

Beak stout, widened towards the apex, scrobes oblique, at a distance from the eyes; antennæ stout, inserted two-fifths from the apex, funicle 6-jointed, first joint stout, rather short, joints 2–3 a little longer than wide, 4–6 transverse, gradually becoming wider and merging into the rather small, elliptoidal clava. Head wide, eyes large, moderately prominent with slightly elevated orbital ridges; prothorax not much wider than long, without ocular lobes, lateral tubercles very small, almost obsolete, anterior margin straight, without cusps; scutel not visible. Elytra rather suddenly wider than the prothorax, oblong, sides subparallel; pygidium nearly perpendicular; prosternum very short in front of the coxæ, very widely emarginate, without ante-coxal ridges; mesosternum declivous, metasternum longer than the first ventral segment, second ventral segment as long as the two following united, the third segment very little narrowed on the sides; anterior coxæ not very prominent, narrowly separated, middle coxæ about three times as widely separated as the anterior. Legs slender, femora not clavate, mutic, tibiæ parallel, not armed at the apex, tarsi long, third joint feebly bilobed, fourth nearly as long as the two preceding joints, claws simple.

A peculiar insect forms the type of this genus. In form and habitus it rather approaches *Phytobius*, to which it becomes still more closely related by the slender tarsi with the third joint but feebly bilobed. A single species.

**P. vestitus** n. sp. Pl. xiv. figs. 5, 35a.—Elongate oblong, black, above densely clothed with dark gray and intermingled with pale scales, the vestiture having a faint bluish reflection; scales on the underside uniformly grayish white. Beak and head densely punctulate and thinly clothed with very small, piliform scales, beak with an obscure elevated line; prothorax scarcely one-half wider than long, feebly constricted at the apex, dorsal channel entire, somewhat expanded and more deeply impressed behind the apical constriction, sides well rounded, lateral tubercles obtuse, disc finely and closely punctured, scales not crowded, sides and dorsal channel a little more densely clothed with whitish scales, basal margin straight each side. Elytra nearly two-fifths wider at the base than the prothorax, subparallel on the sides, striæ rather wide, not deeply impressed, punctured, punctures concealed by the scales, interspaces wide, a little convex with the scales intact, a distinct post-scutellar spot of white scales. Length 2.5 mm.; 0.10 inch.

♂. Last ventral not impressed.

*Hab.*—Indiana. A male specimen in Mr. Ulke's coll. Easily recognized by its elongate form, very dense, scaly vestiture, and the very small, lateral thoracic tubercles.

**PELENOMUS** Thomp.

This genus has for its type *Phytobius camari* Herbst, an insect resembling, in size and general appearance, *P. cavifrons* Lec., but is less stout. Beak robust, more or less widened towards the apex, scrobes oblique, antennal funicle 6-jointed. Eyes rounded, more or less convex and entirely uncovered in repose; prothorax wider than long, narrowed in front, without ocular lobes. Elytra oval, wider at the base than the prothorax; scutel very minute; prosternum very short in front of the coxæ without ante-coxal ridges, mesosternum declivous, truncate posteriorly, side pieces wide, ascending, visible from above; metasternum about as long as the second ventral segment at its middle, side pieces wide; ventral segments 1-2 rather long, the latter fully as long at its middle as the following two segments together, segments 3–4 short, third not narrowed on the sides; anterior coxæ narrowly separated, scarcely one-third the distance of the middle coxæ, not very prominent, middle coxæ subglobose and rather widely separated. Legs slender, femora mutic, tibiæ slender, unarmed, posterior of the male with a very small mucro, third joint of tarsi bilobed, claws simple.

The species are distinguished as follows:

Alternate elytral interspaces with a row of tubercles ..... **cavifrons.**
Elytra not tuberculate.
Antennæ more slender, second joint of funicle distinctly longer than the third, fourth tarsal joint much shorter than joints two and three combined. Pl. xiv, fig 38..... **sulcicollis.**
Antennæ stouter, joints 2-3 of funicle equal, or nearly so.

Fourth tarsal joint longer than the two preceding joints. Elytral interspaces with a row of acute granules. Pl. xiv, fig. 39...**gracilipes.**
Fourth tarsal joint shorter than the two preceding joints.
Front concave, dorsal channel obsolete. Elytra with rows of acute granules.....**asperulus.**
Front not concave, dorsal sulcus distinct. Elytra not asperate.
Beak as long as the head, fourth tarsal joint distinctly shorter than the two preceding joints. Pl. xiv, fig. 37*a*.....**squamosus.**
Beak shorter than the head, fourth tarsal joint scarcely shorter than the two preceding joints. Pl. xiv, fig. 37*b*.....**pusillus.**

**P. cavifrons** Lec. Pl. xiv, fig. 37.—Oval, black, legs rufo-testaceous, above clothed with small, black and white scales, beneath with larger, pale ochreous scales. Beak a little longer than the head, a little widened at the apex, subangulate on the sides densely punctured and scaly; antennæ stout, inserted two-fifths from the apex (♂), or just beyond the middle (♀); joints 2-3 of funicle subequal, a little longer than the outer joints, club subelliptic, acuminate. Head densely punctured and scaly, front deeply concave; prothorax more than one-half wider than long, strongly narrowed in front, base broadly bi-emarginate, sides rounded, apex constricted, broadly and transversely sulcate in its anterior half, anterior margin elevated with two approximate cusps, lateral tubercles rather large, acute, dorsal channel entire, surface densely punctured, sides and transverse sulcus densely clothed with whitish scales. Elytra broadly oval, about one-third wider at the base than the prothorax, broadly rounded on the sides, striæ feebly impressed, closely punctured, each puncture bearing a pale scale, interspaces wide, flattened, except interspaces 3, 5, 7 and 9, which are convex, the former with a row of rather distant tubercles, scales predominantly pale, those of the tubercles blackish, a distinct spot behind the scutellum and another behind the middle on the sutural interspaces of whitish condensed scales, underside densely squamous. Legs slender, thinly clothed with white scales, femora annulate near the apex, tarsi slender, third joint not broadly bilobed, fourth about as long as the two preceding joints together. Length 2.5 mm.; 0.10 inch.

♂. Ventral segments broadly impressed along the middle, the fifth foveate.

♀. Ventral segments feebly impressed.

*Hab.*—California, Utah.

Easily recognized by the rows of tubercles on the alternate elytral interspaces. A specimen in Mr. Ulke's collection presents some structural differences from the typical form that I deem it proper to refer to it as a distinct variety which eventually may prove to be specific.

Var. *torvipes.*—Differs in the following characters: Larger, the anterior transverse sulcus of the prothorax is much shorter, antero-posteriorly, lateral tubercles obtuse and less prominent. Elytra more elongate and more evidently narrowed posteriorly, fifth interspace with a few tubercles, third tarsal joint more broadly bilobed (this is quite evident on comparison with the typical form). Length 3.25 mm.; 0.13 inch.

*Hab.*—Washington (State).

The whole appearance of the insect is darker, the pale scales being less predominant.

**P. sulcicollis** Fab. Pl. xiv, fig. 38.—Broadly oval, dark piceous, antennæ and legs rufo-testaceous, above clothed with small, dark brown scales, inconspicuously variegated with spots of pale scales, underside densely clothed with larger, dirty gray scales. Beak scarcely longer than the head, widened towards the apex, rounded on the sides, densely punctured and scaly; antennæ less stout, inserted about two-fifths from the apex (♂), or just before the middle (♀), first joint of funicle stout and rather long, joints 2 3 distinctly elongated, the former longer than the latter, outer joints short, subturbinate, club relatively larger than in *cavifrons* and not acuminate. Head not wide, obscurely channeled on the vertex, front concave, densely scaly; prothorax almost twice as wide at the base than long, strongly narrowed in front, sides nearly straight behind, base emarginate each side, apical margin elevated with two large and rather distant cusps, between these there is an emargination, lateral tubercles acute, prominent, dorsal channel distinct, entire, becoming gradually wider from the base and widening into a triangular fovea in front, the lateral margins of which extend to the anterior cusps, disc finely and closely punctured, sides densely clothed with pale scales, some scattered pale scales along the sulcus. Elytra broadly oval, less than one-third wider at the base than the prothorax, rounded on the sides, striæ not deeply impressed, moderately wide, punctured, punctures distinct, transverse and rather distant, interspaces moderately wide, slightly convex, with a few very minute, but acute granules; a distinct post-scutellar spot of white or pale yellowish scales, surface tessellate with subquadrate spots of larger, whitish scales; pygidium small, rather coarsely punctured, underside not very closely punctured, punctures small, femora a little stouter than in *cavifrons*, densely scaly, not annulate, tibiæ slender, tarsi moderately stout, third joint broadly bilobed, fourth shorter than the two preceding joints. Length 2.3 mm.; 0.09 inch.

♂. Ventral segments 3-5 flattened, or slightly concave along the middle.

♀. Apex of last ventral segment with a glabrous oval space.

*Hab.*—Pennsylvania, Montana, Illinois, Iowa; Detroit, Mich., (Lake Superior to Georgia, LeConte).

The greater length of the second and third joints of the antennal funicle, the absence of evident elytral tubercles or granules, and the rather short fourth tarsal joint, distinguishes this species from all others of this genus.

**P. gracilopes** n. sp. Pl. xiv, fig. 39.—Oval, piceous, legs rufo-piceous, clothed above and beneath with grayish white scales, smaller and less crowded above. Beak distinctly longer than the head, a little wider towards the apex, the latter subcarinate, rounded on the sides, finely punctured and squamous; antennæ stout, inserted two-fifths from the apex (♀), first joint of funicle moderately stout, the second and third joints very little longer than the outer joints, these gradually wider and merging into the moderately large elliptoidal clava. Head separated from the beak by a curved impression, front deeply concave, orbital margin acutely elevated, densely clothed with scales; prothorax more

than one-half wider than long, rounded on the sides, constricted at the apex. apical cusps prominent, acute and not closely approximate, an acute carina extending from the summit of each cusp and converging towards the median line enclose a triangular fovea, dorsal sulcus ill-defined, obsolete near the base, lateral tubercles very acute, a trifle smaller than the anterior cusps, surface evenly punctured, punctures nearly concealed by the scales, which are a trifle paler and more crowded on the sides. Elytra two-fifths wider at the base than the prothorax, oval, rounded on the sides, striæ not deeply impressed, punctured, each puncture bearing a pale scale, interspaces flattened on the disc, outer ones slightly convex, each from the fifth to the tenth with a row of distinct, small, but acute granules, a few scattered and less distinct granules on the inner interspaces, a spot behind the scutel of white scales; pygidium moderately large, punctured and scaly. Legs as in the preceding species, not very densely scaly, tarsi rather slender, joints 2-3 rather short, the third not broadly bilobed, the fourth joint longer than the two preceding joints, claws slender, diverging. Length 2.3 mm.; 0.09 inch.

♀. Last ventral segment with a small glabrous place.

*Hab.*—West Pl., Neb.; Garland, Col.

Two female specimens in the Nat. Mus. coll. The Colorado specimens differs in several respects from the Nebraska specimen, which has served as the type for the above description, and with a larger series of specimens may prove to be distinct. It has the front scarcely concave, the upper margin of the eyes being hardly raised above the nivean of the front; the vestiture of the upper surface consists of pale and brown scales in nearly equal proportion.

**P. asperulus** n. sp.—Oval, dark piceous, legs and antennæ rufo-piceous, clothed above with pale brown pubescence, intermixed with pale, elongate scales, underside not very densely clothed with moderately large, dirty gray scales. Beak a little longer than the head, widened towards the apex, feebly curved, subangulate on the sides, densely punctured, pubescent, scrobes commence about one-fifth from the apex; antennæ inserted two-fifths from the apex, first joint of funicle distinctly longer than the second, this equal to the third, outer joints scarcely wider, club ovoid, rather large. Head closely and rather coarsely punctured, pubescent, deeply concave between the eyes, the latter convex, prominent, their upper margin reaching considerably above the front; prothorax more than one-half wider than long and about one-fourth wider at the base than at the apex, sides broadly rounded, constricted at the apex, base broadly emarginate each side, lateral tubercles rather small, acute, apical cusps a trifle larger and less acute, rather widely separated, dorsal sulcus obsolete, an indistinct feebly impressed, median line, surface densely and somewhat coarsely punctured, sides densely clothed with whitish scales. Elytra oval, a trifle longer than wide, two-fifths and rather suddenly wider at the base than the prothorax, broadly rounded on the sides, striæ distinct and deeply impressed, punctured, punctures approximate, interspaces flat, finely rugose, each with a row of very small acute granules, more distinct on the outer interspaces, the white scales form indistinct spots and bands: pygidium somewhat compressed laterally and produced toward the apex, densely punctured and pubescent, underside of thorax rather coarsely and densely

punctured, ventral segments more finely punctured; femora feebly clavate, infuscate about the middle, tibiæ slender, a little wider towards the apex, the anterior somewhat curved, middle and posterior nearly straight, tarsi slender, third joint not broadly bilobed, the fourth shorter than the two preceding joints combined, claws simple, slightly divergent. Length 2.0 mm.; 0.08 inch.

♂. Second ventral segment with a round and rather deep fovea, bordered on its anterior circumference by an elevated margin. Last ventral with an ill-defined, triangular and somewhat spongy space.

*Hab.*—Detroit, Mich.

A single specimen in Dr. Horn's coll. The fovea on the second ventral is very remarkable. Differs from the preceding species by its smaller size, much smaller elytral asperities and shorter fourth tarsal joint; from the next species, with which it agrees in size, by the absence of the prothoracic sulcus and the presence of the elytral asperities.

**P. squamosus** Lec. Pl. xiv, fig. 37*a*.—Oval, pitchy black, antennæ and legs rufo-piceous, above densely clothed with small, dark gray scales, having a feeble brassy lustre, indistinctly mottled with larger, grayish white scales, underside not densely clothed with grayish white scales. Beak stout, cylindrical, fully as long as the head and separated from the latter by an ill-defined, curved line in front of the eyes, very little widened towards the apex, densely and rather finely punctured, squamose; antennæ moderate, inserted two-fifths from the apex (♂), second joint of funicle a trifle shorter than the first and distinctly longer than the third, outer joints short, club rather large, elongate. Eyes moderately convex. Head densely punctured, squamose, scarcely concave between the eyes, a median vitta and an ill-defined spot before each eye of white scales; prothorax nearly twice as wide as long, one-third wider at the base than at the apex, feebly rounded on the sides and transversely impressed behind the anterior margin, base very feebly emarginate each side, lateral tubercles acute, anterior margin with two very acute, distant cusps, a little smaller than the lateral tubercles and with the margin between them emarginate, dorsal channel wide, distinct, ending into a triangular fossa anteriorly; surface densely and finely punctured, sides and dorsal sulcus clothed with white scales; scutel very small, scarcely visible. Elytra one-third wider at the base than the prothorax, a little longer than wide, moderately narrowed behind, humeri rather prominent, striæ not deeply impressed, punctures small, rather distant, interspaces flattened, finely punctured, without asperities, the pale scales are condensed in transverse fascias and along the suture, a short line behind the scutellum of dark gray, velvety scales; pygidium finely and densely punctured, underside not coarsely punctured. Legs and tarsi slender, third joint of the latter not broadly bilobed, last joint shorter than the two preceding joints. Length 2.0 mm.; 0.08 inch.

♂. Last ventral segment with a large, quadrilateral fovea, fully occupying the middle third of the segment and limited each side by a ridge.

*Hab.*—Coeur d'Alene, Idado (New York, Michigan, British Columbia, LeConte).

The single specimen in my collection and which has served as the type for the above description, was collected by Mr. Wickham at

the above-named locality. It agrees well with the description as given by Dr. LeConte, differing only in that the author describes the species as densely scaly above, which is not the case in my specimen. In appearance it closely resembles the next; it is, however, easily distinguished by the longer beak, the longer fourth tarsal joint and the sexual characters of the male.

**P. pusillus** n. sp. Pl. xiv, fig. 37*b*.—Of the same size as *squamosus*, with which it agrees, except in the following points: Beak very stout, shorter than the head. Eyes less convex, the scales on the upper surface are brownish with a distinct brassy lustre and more conspicuously mottled with larger white scales; scales of underside of prothorax and mesosternal side pieces ochreous. Legs rufous, fourth tarsal joint distinctly longer, nearly equal to the two preceding joints.

♂. Last ventral with a small longitudinal fovea.

*Hab.*—Tampa, Fla.

The single specimen before me is a male in Dr. Horn's coll. and bears the label, "*squamosus* Lec."; however, the description tallies less with this than the preceding species. The more northern habitat of the former would also in a measure lend support to this view; still, should a comparison with the type prove my conclusions to be erroneous, the specific name adopted for the present species may be applied to the one which I consider as *squamosus* Lec.

### MECOPELTUS gen. nov.

This genus differs from *Pelenomus* only in the presence of distinct ante-coxal ridges, forming a prosternal canal, more or less distinct for the reception of the rostrum in repose, the latter is a little less robust; antennal funicle 6-jointed, club large, the first joint forming fully one-half its mass; orbital margin acutely elevated; second abdominal segment longer than the two following united, the third not narrowed on the sides; prosternum longer in front of the coxæ; the scutellum is minute, but visible in all. In general appearance the species do not differ from those of the preceding genus and may be distinguished as follows:

Antennæ more slender, second joint of funicle distinctly elongate, elytra rounded on the sides.
  Front concave, scales without lustre, dull ..... **fuliginosus.**
  Front not concave, scales with a brassy lustre ..... **scandens.**
Antennæ stouter, second joint of funicle not distinctly elongate, scarcely longer than wide.

Elytra without a pale, sutural spot.
Elytral interspaces with a row of acute granules.
Subdepressed, elytra trapezoidal, scales without lustre.
**obscurefasciatus.**
Convex, elytra rounded on the sides, scales with brassy lustre.
**aeneosquamosus.**
Elytra not granulate.....**congenialis.**
Elytra with a pale, sutural spot.....**scoliosus.**

**M. fuliginosus** n. sp.—Oval, pitchy black, antennæ and legs rufo-piceous, above thinly clothed with very small grayish scales, not concealing the derm, inconspicuously mottled with somewhat larger, whitish scales and some pale pubescence, underside more densely clothed with sordid gray scales. Beak longer than the head and separated from it by an impressed, not very distinct, curved line, gradually widened from base to apex, rounded on the sides, densely punctured, each puncture bearing a fine, piliform scale; antennæ rather slender, inserted scarcely one-third (♂), or nearly two-fifths (♀), from the apex, first two joints of funicle elongate, first joint stout, second slender, longer than the third joint which is a little longer than the following joints Eyes round, convex, orbital margin acutely elevated. Head densely punctured, front concave between the eyes; prothorax about one-half wider than long and one-third wider at the base than at the apex, rounded on the sides before the middle, broadly but not strongly constricted at the apex, lateral tubercles large, acute, anterior cusps rather large and also acute, somewhat remote and connected with the former by a nearly straight marginal line, an oblique impression in front of each lateral tubercle, dorsal channel entire, expanding anteriorly into a triangular fossa having in its centre a deep fovea, surface densely and rather finely punctured, sides densely clothed with rather large, dirty yellowish scales. Elytra oval, one-third wider at the base than the prothorax, humeri somewhat prominent, sides broadly rounded to the apex, striæ rather wide, not deeply impressed, punctures transverse, approximate, interspaces feebly convex, transversely rugose, outer interspaces with a row of very small, acute granules, each bearing a short recurved seta; pygidium finely punctured; ante-coxal ridges acute, underside densely punctured. Legs slender, femora and tibiæ infuscate about the middle, tarsi slender, third joint scarcely twice the width of the preceding joint, the fourth projecting more than the length of the third, claws simple, rather small, divaricate. Length 2.75-3.0 mm.; 0.11-0.12 inch.

♂. Last ventral not impressed, middle tibiæ distinctly unguiculate, posterior with a minute mucro at the apex.

*Hab.*—Canada, Massachusetts, Pennsylvania, Oregon, Nevada, Texas, New York.

Resembles *Pelenomus sulcicollis*, with which it has been confounded in collections, but is larger and of more sombre appearance. The presence of ante-coxal ridges is sufficient to distinguish the two species.

**M. scandens** n. sp.—Oval elliptic, black, antennæ and legs ferruginous, above thinly clothed with very small, pale brown scales, inconspicuously mottled with small spots of white scales and intermixed with a fine pubescence having a

brassy lustre, underside more densely clothed with grayish white scales. Beak stout, a trifle shorter than the head and separated from it by a curved, impressed line, distinctly widened towards the apex, rounded on the sides, densely punctured except a space just before the apex, each puncture bearing a small, brassy scale; antennæ slender, first joint of funicle stout, second and third elongate, slender, the third a little shorter than the second, outer joints short. Eyes moderately convex. Head densely punctured, front not concave between the eyes, more densely scaly on the sides behind the eyes; prothorax more than one-half wider than long, less than one-third wider at the base than at the apex, which is feebly constricted, sides broadly rounded, lateral tubercles moderately large, acute, apical cusps very little smaller, distant and very acute, apex distinctly emarginate between the two cusps, dorsal sulcus distinct, broad, widening anteriorly into a well marked, triangular fossa, a transverse impression in front of each lateral tubercle, which extends towards and attains the median sulcus, surface closely punctured, punctures rather large, each bearing a small scale, sides densely clothed with large, yellowish white scales, base broadly emarginate each side; scutel quite distinct, glabrous. Elytra longer than wide, about one-third wider at the base than the prothorax, humeral angle rather prominent, sides broadly rounded and gradually narrowed towards the apex, striæ not deeply impressed, distinctly punctured, punctures transverse, closely set, interspaces feebly convex, finely punctured and without asperities, the sutural interspace clothed with grayish white, velvety scales interrupted behind the scutellum by a darker spot; pygidium densely punctured; underside, and especially the sterna, very closely and somewhat coarsely punctured. Legs and tarsi slender, the third tarsal joint scarcely one-half wider than the preceding one, the fourth about as long as the two preceding joints, claws feebly divergent. Length 2.25-0.09 inch.

♀. Last ventral segment with a very small, glabrous space at the apex.

*Hab.*—"Cambr" (?).

A single female specimen in Dr. Horn's coll. The ante-coxal ridges are less marked than in the preceding species, resembling in this respect *scoliosus*. It very closely resembles *æneosquamosus*, from which it is distinguished by its less robust form, the longer second and third joints of the antennal funicle and the velvety line on the sutural interspace.

**M. obscurefasciatus** n. sp.—Subtrapezoidal, moderately stout, somewhat depressed, pitchy black, tibiæ and tarsi rufo-piceous, above not densely clothed with small, grayish brown scales and variegated on the elytra with ill-defined, transverse fasciæ of white scales, the scales intermixed with a short, coarse pubescence, underside clothed with dirty gray scales. Beak a little longer than the head and separated from it by a curved, impressed line, curved, subcylindrical, somewhat flattened above and widened towards the tip, closely and rather coarsely punctured, thinly squamous; antennæ piceous, inserted less than one-third (♂) or nearly two-fifths (♀) from the apex, rather stout, joints 2-3 of funicle not elongate, scarcely longer than wide, very little longer than the outer joints. Eyes convex, supra-orbital margin acutely elevated. Head densely and rather coarsely punctured, concave between the eyes; prothorax about one-half wider than long, one-third wider at the base than at the apex, the latter

somewhat constricted, sides subparallel behind the middle, rounded before, lateral tubercles prominent, acute, anterior cusps distinct, acute and rather distant, dorsal channel ill-defined, entire, expanding anteriorly into a triangular not deeply impressed fossa, surface densely punctured, punctures rather large, each bearing a small scale, sides densely clothed with whitish scales; scutel very small, scarcely visible. Elytra trapezoidal, two-fifths wider at the base than the prothorax, humeri prominent, sides nearly straight and narrowed posteriorly for three-fourths their length, rather suddenly rounded to the apex, striæ rather wide, more deeply impressed near the base, punctured, punctures small and more or less concealed by the scales, alternate interspaces a trifle more convex, punctured, outer interspaces with a row of distant, very small, acute granules, each bearing a short, recurved seta; pygidium densely punctured, underside as in the preceding species; ante-coxal ridges distinct. Legs slender, third tarsal joint nearly twice the width of the second, fourth shorter than the two preceding joints together, claws divergent. Length 2.75 mm.; 0.11 inch.

♂. First and second ventral segments impressed, tibiæ not unguiculate.

*Hab.*—Nevada.

Four specimens in Dr. Horn's coll. are before me. Its nearest ally is *æneosquamosus*.

**M. æneosquamosus** n. sp.—Oval, convex, dark piceous, antennæ and legs ferruginous, above not dense clothed with small scales having a brassy lustre indistinctly mottled with pale spots. Beak, antennæ and head as in the preceding species; prothorax one-half wider than long, nearly straight on the sides behind, rather suddenly narrowed in front and broadly constricted at the apex, constriction not extending upon the disc, lateral tubercles prominent, acute, anterior cusps about as large, rather distant, dorsal channel broad, expanding anteriorly into a triangular fossa, an oblique impression in front of the lateral tubercles, surface densely punctured, sides densely clothed with yellowish gray scales; scutel very small. Elytra oval, convex, two-fifths wider at the base than the prothorax, humeri prominent, sides rounded, striæ not deeply impressed, punctures small, not closely approximate, interspaces feebly convex, alternate ones a trifle more so, outer interspaces with a row of very small, acute granules, each bearing a short recurved seta: pygidium closely and finely punctured; ante-coxal ridges distinct, underside densely punctured and scaly. Legs and tarsi as in the preceding. Length 2.25-2.75 mm.; 0.09-0.11 inch.

♂. Second ventral segment segment with a small, longitudinal fovea, surrounded anteriorly by a patch of large yellow scales.

*Hab.*—Oregon, Texas. Dr. Horn's and Nat. Mus. collections.

Three males and six females are before me. This species closely resembles *obscurefasciatus* in appearance, but is more convex, the scales have a decided brassy lustre, the elytra rounded on the sides, legs entirely ferruginous, femora dusky at the base, and lastly the sexual differences of the males. The single specimen from Texas is a little longer than the Oregon specimens but does not differ otherwise. Also closely related to the next species.

**M. congenialis** n. sp.—Differs from the last species as follows: Less robust; antennæ inserted just before the middle (♂); orbital margin only slightly elevated, front not concave between the eyes; prothorax more than one-half wider than long, anterior cusps much smaller, very acute and a little more remote. Elytra one-third wider at the base than the prothorax, somewhat shining, very thinly clothed with very small scales without metallic lustre, conspicuously mottled with spots of white scales, a short scutellar line of dark, velvety scales, striæ well impressed, distinctly and closely punctured, interspaces convex, punctulate, without acute granules; underside of body more densely clothed with grayish white scales, femora more densely scaly, obscurely annulate. Length 2.25 mm.; 0.09 inch.

♂. Apical half of last ventral segment with a well defined, transversely oval, glabrous fovea.

*Hab.*—Oregon.

A unique specimen in Nat. Mus. coll. Might readily be confounded with *æneosquamosus*, with which, indeed, I had confounded it, but for the difference in the sexual characters of the male. The elytra are more shining, not densely scaly and distinctly mottled with spots of white scales.

**M. scoliasus** n. sp.—Oval elliptic, convex, black, antennæ and legs rufous, infuscate; above rather densely clothed with dirty gray scales, variable in size, underside clothed with small oval scales, not at all crowded except on the mesosternum and the last ventral segment. Beak a little longer than the head, feebly curved, a little wider towards the apex, separated from the head by an impression, densely punctured, subcarinate in its apical half. Head densely punctured, feebly concave between the eyes, the latter slightly convex; antennæ stout, inserted immediately before the middle (♂), first joint of funicle robust, joints 2–3 not elongate; prothorax nearly one-half wider than long, one-third wider at the base than at the apex, widest at the base, sides straight and slightly convergent for three-fifths their length, rather suddenly rounded in front and feebly constricted at the apex, lateral tubercles large, very acute, anterior cusps nearly as large as the tubercles, not widely separated, dorsal sulcus broad, ill-defined posteriorly, widening and more sharply defined in front by ridges extending to the summit of the anterior cusps, disc closely and rather coarsely punctured, sides densely squamose; scutel very minute. Elytra oval, one-third wider at the base than the prothorax, rounded on the sides, striæ rather wide, well impressed, closely and coarsely punctured, more or less concealed by the scales, interspaces rather convex, finely rugose, outer interspaces with a row of small, setiferous granules, a common sutural spot of pale scales near the base; pygidium densely and finely punctured; ante-coxal ridges not sharply defined. Legs slender, femora infuscate about the middle, tarsi slender, third joint scarcely one-half wider than the second, fourth joint nearly as long as the two preceding joints together, claws divergent. Length 2.0 mm.; 0.08 inch.

♂. Cannot discover any sexual characters on the ventral surface.

*Hab.*—Wyoming.

Two male specimens in Dr. Horn's coll. At once recognized by the conspicuous, pale sutural spot.

**RHINONCUS** Sch.

Beak stout, widened towards the apex, scrobes oblique, deep; antennæ with 7-jointed funicle, clava elliptic, acuminate. Eyes large, rounded, more or less convex, without distinct supra-orbital ridges; scutel not visible; prosternum long in front of the coxæ, deeply emarginate, with distinct ante-coxal ridges; mesosternum oblique, metasternum a little shorter than the first ventral segment; second ventral segment as long, or longer than the two following segments together, the third segment not narrowed on the sides, fully attaining the lateral margin; anterior coxæ conical, prominent and rather widely separated, middle coxæ globular, separated about twice the distance of the anterior coxæ, their cavities formed equally by the meso- and metasternum. Legs rather slender, third tarsal joint bilobed, claws armed with a long tooth.

The species of this genus, although varying from a broadly oval to an elongate form, present a habitus peculiarly their own. The expression "without distinct orbital ridges," as used in the analytical table and again in the above description of the genus requires some explanation, inasmuch as such a ridge, ill-defined as it is, exists in most of the species examined by me. Dr. LeConte's statement, "no trace of supra-orbital ridge," is therefore erroneous. In the European species, *R. topiarius*, this ridge is quite prominent and the front concave, as much so as in certain Pelenomi; it is entirely absent only in *R. longulus* Lec. and its European congener, *R. perpendicularis*. In all the anterior coxæ are much more widely separated than in *Pelenomus* or *Mecopeltus*. In all the species there exists a conspicuous scutellar spot of white or pale scales, and the anterior thoracic margin is entire. The apical armature of the tibiæ in the male differs in each of the three species.

I have no additions to make to the three species heretofore known and which may be distinguished as follows:

Eyes as widely separated above as the width of the beak, the latter longer than the head: form stout.
Larger, elytra not tuberculate.....**occidentalis.**
Smaller, elytra tuberculate.....**pyrrhopus.**
Eyes encroaching upon the front, beak shorter than the head; form oblong. **longulus.**

**R. occidentalis** n. sp.—Oval, robust, black, antennæ and legs piceous; above thinly clothed with coarse grayish pubescence; beneath densely clothed with dirty gray scales. Beak a little longer than the head and separated from it by a curved impression in front of the eyes, widened at its apical third, distinctly

carinate and closely and coarsely punctured, except near the apex; antennæ slender, inserted (♂ and ♀) one-third from the apex, scape impunging against the eye. first joint of funicle moderately stout, second long and slender, fully as long, or longer than the first, joints 3-4 shorter, outer three joints transverse and slightly wider. Eyes feebly convex with slightly raised supra-orbital ridges, separated nearly as widely as the width of the beak. Head densely and coarsely punctured, front flattened; prothorax one-half wider than long, rounded on the sides and feebly constricted at the apex, about one-fourth wider at the base than at the tip; lateral tubercles very small, obtuse, dorsal sulcus entire, more deeply impressed behind, a transverse, ill-defined impression each side behind the middle, surface coarsely punctured, punctures crowded on the sides. Elytra oval, about one-fourth wider at the base than the prothorax, sides rounded, striæ wide, deep, closely and coarsely punctured, interspaces subconvex, alternately a little wider, rugose, the wider interspaces with pale, piliform scales, scutellar spot very conspicuous, cardiform; pygidium like the underside, rather coarsely and closely punctured; femora subclavate, tibiæ widened at the apex, third tarsal joint broadly bilobed, fourth long, projecting the length of the preceding joint, claws armed with a strong tooth one-half the length of the claw. Length 3.5–4.0 mm.; 0.14-0.16 inch.

♂. Fifth ventral segment broadly emarginate, shorter than the two preceding segments together, anterior tibiæ unguiculate at the apex.

♀. Fifth ventral rounded, longer than the two preceding segments.

*Hab.*—Canada, Kansas, Iowa, Indiana (Pennsylvania, Lake Superior, LeConte).

This species is known in our lists and collections as *pericarpius*, and it is not without hesitancy that I propose a new name for a fairly well-known species. In size and general appearance it agrees well with the European species, but differs from it in the following points: 1. beak carinate; this is constant, though varying in degree in all the numerous specimens before me, while in eight European specimens of *pericarpius* from different localities a slight indication of a carina exists only in two specimens; 2. the curved impression at the base of the rostrum is not noticeable in *pericarpius;* 3. the fourth tarsal joint projecting about the length of the third joint, whereas in *pericarpius* the third is relatively shorter, the fourth projects distinctly more than the length of the former.

**R. pyrrhopus** Boh.—Suboval, piceous, antennæ and legs paler, clothed above with a coarse brownish pubescence, variegated in varying proportion with whitish piliform scales, underside clothed with whitish scales which are more dense on the sterna and their side pieces. Beak longer than the head, cylindrical, feebly curved, carinate, densely punctured and scaly in its basal half, finely punctured, shining and widened towards the apex. first joint of funicle stout, second elongate, longer than the third, outer joints a little wider. Eyes slightly convex, with feeble supra-orbital ridges, separated above nearly the width of the beak. Head densely punctured, squamose, slightly concave between the eyes; prothorax less than one-half wider than long, narrowed in front, feebly rounded on the

sides, broadly and distinctly constricted at the apex, lateral tubercles small, subacute; dorsal channel entire or nearly so, less distinct anteriorly, surface coarsely punctured, less so in front. Elytra oval, less than one-third wider at the base than the prothorax, broadly rounded on the sides, striæ rather wide, well impressed, punctures small and rather distant, interspaces convex, rugose, each with a row of small tubercles or granules, behind the distinct scutellar spot is a dark velvety line; pygidium densely punctured, coarsely pubescent; femora subclavate, tibiæ slightly curved, especially the anterior pair, tarsi slender, third joint broadly bilobed, fourth as long as the two preceding joints, claws with a long basal tooth. Length 2.5-2.75 mm.; 0.10 0.11 inch.

♂. Last ventral with a small glabrous space at the apex; middle and posterior tibiæ unguiculate at the apex.

*Hab.*—Eastern, Western and Southern States.

Our most common species. The Eastern specimens are generally smaller and less conspicuously mottled than the Western.

**R. longulus** Lec.—Oblong, elliptic, black, antennæ and tarsi paler, above thinly clothed with a very short, fine pubescence, interspersed with isolated, elongate white scales; scales on the underside white, not dense, except on the mesosternum and between the anterior coxæ. Beak very stout, shorter than the head, widened at the apex, coarsely punctured and scaly near the base; antennæ rather stout, inserted just before the middle, scape testaceous, funicle and clava darker, first joint of funicle robust, second not elongate, shorter than the first and a little longer than the third, club oval. Eyes round, feebly convex and encroaching upon the front, without supra-orbital ridges, separated above about one-half the width of the rostrum. Head convex, densely punctured; prothorax about as long as wide, scarcely one-fourth wider at the base than at the apex, broadly rounded on the sides and feebly constricted at the apex, lateral tubercles absent, dorsal channel extending to about the middle, surface densely punctured, especially on the sides, the latter densely clothed with large, cream-colored scales and enclosing an oval, glabrous space, dorsal channel squamose. Elytra elongate, one-third wider at the base than the prothorax, humeri rounded, sides nearly straight for one-half their length, then gradually rounded to the apex, striæ deep, distinctly punctured, punctures not closely approximate, interspaces coarsely rugose, scutellar spot very conspicuous, another less distinct sutural spot on the declivity and some lines of white scales; pygidium densely and finely punctured; prosternum broadly and less deeply emarginate. Legs slender, femora not clavate, tibiæ scarcely wider at the apex, tarsi slender, third joint broadly bilobed, fourth shorter than the two preceding joints, claws with a long tooth. Length 2.5-3.0 mm.; 0.10-0.12 inch.

♂. Last ventral slightly glabrous at the apex, middle tibiæ unguiculate at the apex.

*Hab.*—Pennsylvania (Allegheny County, Dr. Hamilton), Southern and Western States.

Easily recognized by its elongate form; structurally and in appearance it agrees with the European *R. perpendicularis* Reich., but is much larger. Two specimens in Mr. Ulke's coll. are ferruginous, due no doubt to immaturity.

## PHYTOBIUS Sch.

This genus is at once distinguished from the other genera of this subtribe by the very slender tarsi, the fourth joint equaling in length the three preceding joints. The rostrum is less stout, longer than the head, scrobes oblique, straight, at some distance from the eyes; antennæ with 6-jointed funicle, joints 1–3 elongate, club variable. Eyes rather small, round, convex and entirely exposed; base of prothorax produced into an acute, triangular process at the middle; scutel scarcely visible. Elytra wider at the base than the prothorax, distinctly narrowed posteriorly; pygidium large, prosternum very short in front of the coxæ, broadly emarginate, without ante-coxal ridges, mesosternum broad, truncate behind, forming one-half of the middle coxal cavities, side pieces wide, ascending; metasternum short, side pieces wide; first ventral segment a little longer than the second, segments 3–4 short, third not narrowed on the sides; anterior coxæ conical, prominent, subcontiguous, separated by a very thin lamina of the prosternum, middle coxæ subglobose, rather widely separated, posterior coxæ small, distant from the lateral margin and but a little more widely separated than the middle coxæ. Legs long and slender, femora mutic, tibiæ not armed at the apex, tarsi as described above, claws simple.

The two species thus far known to occur within our faunal limits present structural differences of sufficient importance to warrant the establishment of two subgenera, as follows:

Mesosternal side pieces wider, epimera ascending between the prothorax and the elytra, freely visible from above.....**Phytobius**.
Mesosternal side pieces narrower, epimera not ascending between prothorax and the elytra, not visible from above.....**Euhrychiopsis**.

### Subgenus Phytobius.

Prothorax much wider than long, narrowed anteriorly; mesosternal side pieces freely visible from above; the derm is covered with a dense layer of scales, which, on the upper surface, overlap each other, forming a sort of water-proof covering similar to that seen in certain genera of the Erirhinini. The European *P. velatus* Beck, the type of the genus, belongs here.

One species:

**Ph. griseomicans** n. sp. Pl. xiv, fig. 40.—Oval, black, antennæ and legs rufo-testaceous, above densely clothed with grayish, slate-colored scales, having a peculiar velvety appearance, beneath with pale ochreous, rounded scales. Beak as long as the prothorax, rather slender, a little widened at the apex, finely punc-

tured and squamose towards the base; antennæ slender, inserted two-fifths from the apex (♂), the scape not attaining the eye, first joint of funicle longer than the following joints. Eyes with orbital ridges. Head finely punctured, occipital carina continued to the front, the latter concave between the eyes; prothorax more than one-half wider than long, widest a little before the basal angles, sides feebly and somewhat irregularly rounded, gradually narrowed for three-fourths their length then suddenly narrowed to and somewhat constricted at the apex: lateral tubercles small, acute, dorsal channel entire, surface uneven, anterior margin with two remote, very small and obtuse cusps, disc densely punctured, punctures concealed by the scales, sides densely clothed with ochreous scales. Elytra less than two-fifths wider at the base than the prothorax, humeri rounded, prominent, sides nearly straight for three-fifths their length, then rounded to the apex, striæ wide, impressed, punctures concealed by the scales, interspaces convex, scutellar region clothed with pale, whitish or yellowish scales: pygidium densely punctured, squamous; underside of body densely punctured; femora at tip and tarsi dusky. Length 3.0 mm.; 0.12 inch.

♂. Last ventral segment with a narrow glabrous space at the apex.

*Hab.*—Dakota.

Two males, one in Dr. Horn's (without locality label), the other in Mr. Ulke's coll., are before me. Very closely related, if not identical with the European *P. velatus*, a male specimen of which, in Dr. Horn's collection, is also before me, and from which it appears to differ only in the more elongate beak and the more slender antennæ; the scaly vestiture on the upper surface also differs somewhat. I have retained the name of this species by which it is known in our collections and in the Third Supplement to the List of N. A. Coleoptera by Mr. Samuel Henshaw. As I had not seen any description of this species I wrote to Mr. E. A. Schwarz, the reputed author, for information, and to kindly give me the name, etc., of the publication containing the description of this and two other species. This inquiry Mr. Schwarz has not seen fit to answer. I also wrote to several other gentlemen who might be in a position to give me the desired information, but with negative results. Under these circumstances no other course is left for me but to describe the species as new.

### Subgenus Euhrychiopsis.

Prothorax very little wider than long, scarcely narrowed at the apex; mesothoracic side pieces not visible from above; scales on the upper side not imbricate and forming a water-proof coating. Represented by

**Ph. lecontei** n. sp.—Elongate, black, antennæ and legs rufo-testaceous, scales on the upper surface of a yellowish green, beneath of a yellowish gray color. Beak moderately stout, a little longer than the head, widened at the apex,

subcarinate, punctured and scaly towards the base, antennæ inserted about the middle, second joint of funicle elongate, longer than the first, clava rather small, elongate elliptic, acuminate. Eyes without supra-orbital ridges. Head densely scaly, not concave between the eyes, occipital carina extending upon the front; prothorax a trifle wider at the base than long, widest about the middle, lateral margin subangulate, tubercles very small, scarcely discernible, dorsal channel wide, entire, anterior margin with two distant, extremely small cusps: punctures, where visible, rather coarse, sides and dorsal channel densely scaly. Elytra two-fifths and rather suddenly wider at the base than the prothorax, humeri prominent, sides gradually narrowed from the shoulders; striæ deep, wide, distinctly punctured, interspaces convex, rugose, sides and sutural interspace densely scaly, striæ of the disc each with a row of scales; femora densely squamous, apex and end of fourth tarsal joint dusky. Length 2.25-2.5 mm.; 0.09 0.10 inch.

♂. The glabrous space at the apex of the last ventral segment is almost obsolete.

*Hab.*—Michigan (Detroit).

The remarks under the preceding species also apply here. Dr. LeConte considered this as identical with the European *Ph. velatus* Beck. Mr. Schwarz is credited with calling this species *lecontei*.

## Bibliography and Synonymy.

MONONYCHUS Germ.

1. M. vulpeculus Fab., Syst. El. ii, 450; Oliv., Ent. v, No. 83, 129, pl. 427; Boh., Sch. Curc. iv, 309; Say, Curc. 20, ed. Lec. i, 286.

CRAPONIUS Lec.

1. C. inæqualis Say, Curc. 20, ed. Lec. i, 286 (*Ceutorhynchus*); Lec., Proc. Amer. Philos. Soc. xv, 269.

CNEMOGONUS Lec.

1. C. lecontei n. sp.

ACANTHOSCELIS gen. nov.

1. A. californicus n. sp.
2. A. frontalis n. sp.
3. A. griseus n. sp.
4. A. ilex n. sp.
5. A. curtus Say, Curc. 20, ed. Lec. i, 298 (*Ceutorhynchus*); Gyll., Sch. Curc. iv, 287.
6. A. acephalus Say, Jour. Ac. Nat. Sci. Phila. iii, 309; ed. Lec. i, 173; Germ., Sch. Curc. iv, 289; *sabulirostris* Gyll., Sch., Curc. iv, 288 (*Cœliodes*); *leprosus* Boh., Sch. Curc. viii, 1, 394 (*Cœliodes*).

   Var. *tenebrosus*.
7. A. tarsalis n. sp.
8. A. guttatus n. sp.
9. A. perplexus n. sp.
10. A. mendicus n. sp.
11. A. pusillus n. sp.

### AULEUTES gen. nov.

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1. A. curvipes n. sp.
2. A. asper Lec., Proc. Amer. Philos. Soc. xv, p. 270.
3. A. tenuipes Lec., Proc. Amer. Philos. Soc. xv, 270.
4. A. ater n. sp.
5. A. tuberculatus n. sp.
6. A. subfasciatus n. sp.
7. A. tachygonoides n. sp.
8. A. longirostris n. sp.
9. A. epilobii Payk., Fn. Succ, iii, 259; Germ., Fn. Ins. Eur. 18, 13; Gyll., Sch. Curc. iv, 288; *cruralis* Lec. (*Cœliodes*), Proc. Amer. Philos. Soc. xv, 270.

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10. A. nasalis Lec., Proc. Amer. Philos. Soc. xv, 271.
11. A. nebulosus Lec., Proc. Amer. Philos. Soc. xv, 271.

### PELENOSOMUS gen. nov.

1. P. cristatus n. sp.

### ORCHESTOMERUS gen. nov.

1. O. ulkei n. sp.
2. O. wickhami n. sp.

### ACALLODES Lec.

1. A. ventricosus Lec., Proc. Amer. Philos. Soc. xv, 272.
2. A. salcoides n. sp.

### CŒLIODES Sch.

1. C. apicalis n. sp.
2. C. vitiosus n. sp.

### CEUTORHYNCHUS Germ.

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1. C. subpubescens Lec., Proc. Amer. Philos. Soc. xv, 273.
2. C. affluentus n. sp.
3. C. seriesetosus n. sp.
4. C. isolatus n. sp.
5. C. rudis Lec., Proc. Amer. Philos. Soc. xv, 275.
6. C. sericans Lec., Proc. Amer. Philos. Soc. xv, 275.

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7. C. angulatus Lec., Proc. Amer. Philos. Soc. xv, 277.
8. C. consanguineus n. sp.
9. C. disturbatus n. sp.
10. C. obliquus Lec., Proc. Amer. Philos. Soc. xv, 278.
11. C. tau Lec., Proc. Amer. Philos. Soc. xv, 278.
12. C. ovipennis n. sp.

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13. C. sulcipennis Lec., Proc. Amer. Philos. Soc. xv, 274.
14. C. decipiens Lec., Proc. Amer. Philos. Soc. xv, 275.

15. C. cyanipennis Germ., Ins. spec. nov. 235; Gyll., Sch. Curc. iv, p. 58; Illig., Dej. Cat. 3d ed. 323.
16. C. æratus n. sp.
17. C. bolteri n. sp.
18. C. hirticollis n. sp.
19. C. armatus n. sp.
20. C. pollinosus n. sp.

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21. C. hornii n. sp.
22. C. nodipennis n. sp.
23. C. adjunctus n. sp.

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24. C. mutabilis n. sp.
25. O. ovalis n. sp.
26. C. intermedius n. sp.
27. C. numulus n. sp.
28. C. hamiltoni n. sp.
29. C. pusia Mann., Bull. Mosc. 1852, ii, 355; Lec., Proc. Amer. Philos. Soc. xv, 276.
30. C. adspersulus n. sp.
31. C. pusilus Lec., Proc. Amer. Philos. Soc. xv, 276.
32. C. pauxillus n. sp.
33. C. convexicollis Lec., Proc. Amer. Philos. Soc. xv, 276.
Var. *atomus*.

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34. C. anthonomoides n. sp.
35. C. squamatus Lec., Proc. Amer. Philos. Soc. xv, 277.
36. C. oregonensis n. sp.
37. C. siculus n. sp.
38. C. persimilis n. sp.
39. C. albopilosulus n. sp.

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40. C. semirufus Lec., Proc. Amer. Philos. Soc. xv, 278.
41. C. medialis Lec., Proc. Amer. Philos. Soc. xv, 279.
42. C. erythropus n. sp.
43. C. morosus n. sp.
44. C. atriculus n. sp.
45. C. septentrionis Gyll., Sch. Curc. iv, 492; Lec., Proc. Amer. Philos. Soc. xv, 279.
46. C. puberulus Lec., Proc. Amer. Philos. Soc. xv, 279.
47. C. zimmermanni Gyll, Sch. Curc. iv, 492; Lec., Proc. Amer. Philos. Soc. xv, 279.

**RILEYONYMUS** gen. nov.

1. R. relictus n. sp.

**CŒLOGASTER** Sch.

1. C. zimmermanni Gyll., Sch. Curc. iv, 580; Lec., Pr. Am. Phil. Soc. xv, 283.
2. C. lituratus n. sp.

### PERIGASTER gen. nov.

1. P. **cretura** Herbst. Käfer vii, 70, pl. 100. fig. 5 (*Curculia*); Say, Curc. 20; ed. Lec. i, 285 (*Ceutorhynchus*); *Falciger 4-spinosus* Say, Jour. Ac. Nat. Sci. Phila. iii, 310; Lec., ii, 173, *Phytobius 4-spinosus* Gyll., Sch. Curc. iii, 463; Lec., Proc. Amer. Philos. Soc. xv, 283.
2. P. **obscurus** Lec., Proc. Amer. Philos. Soc. xv, 283.

### PERENTHIS gen. nov.

1. P. **vestitus** n. sp.

### PELENOMUS Thomps.

1. P. **cavifrons** Lec., Proc. Amer. Philos. Soc. xv, 282.
2. P. **sulcicollis** Fab., Sch. Curc. vii, 346; Lec., Proc. Am. Phil. Soc. xv, 281.
3. P. **gracilipes** n. sp.
4. P. **asperulus** n. sp.
5. P. **squamosus** Lec., Proc. Amer. Philos. Soc. xv, 281.
6. P. **pusillus** n. sp.

### MECOPELTUS gen. nov.

1. M. **fuliginosus** n. sp.
2. M. **scandens** n. sp.
3. M. **obscurefasciatus** n. sp.
4. M. **æneosquamosus** n. sp.
5. M. **congenialis** n. sp.
6. M. **scoliasus** n. sp.

### RHINONCUS Sch.

1. R. **occidentalis** n. sp.
2. R. **pyrrhopus** Boh., Sch. Curc. viii, 2, 172; Lec., Proc. Am. Phil. Soc. xv, 284.
3. R. **longulus** Lec., Proc. Amer. Philos. Soc. xv, 284.

### PHYTOBIUS Sch.

Subgenus *Phytobius* stricte sic dicta.

1. P. **griseomicans** n. sp. (Schwarz MSS.).

Subgenus *Euhrychiopsis*.

2. P. **lecontei** n. sp. (Schwarz MSS.).

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## EXPLANATION OF PLATE XII.

Fig. 1. Abdomen of *Craponius inæqualis*.
" 2. Anterior tibia of *Cnemogonus lecontei*.
" 3. *Acanthoscelis guttatus*.
" 4. " *pusillus*.
" 5. " *californicus*, middle tibia of ♂; 5*a*, posterior tibia of do.
" 6. " *frontalis*, lateral view of head; 6*a*, middle tibia of ♂ of do.
" 7. " *griseus*, posterior tibiæ of ♂.
" 8. " *ilex*, posterior tibia of ♂.
" 9. " *acephalus*, lateral view of head; 9*a*, anterior tibiæ and tarsus of do; 9*b*, posterior tibiæ of do.
" 10. " *curtus*, posterior tibiæ of ♀.

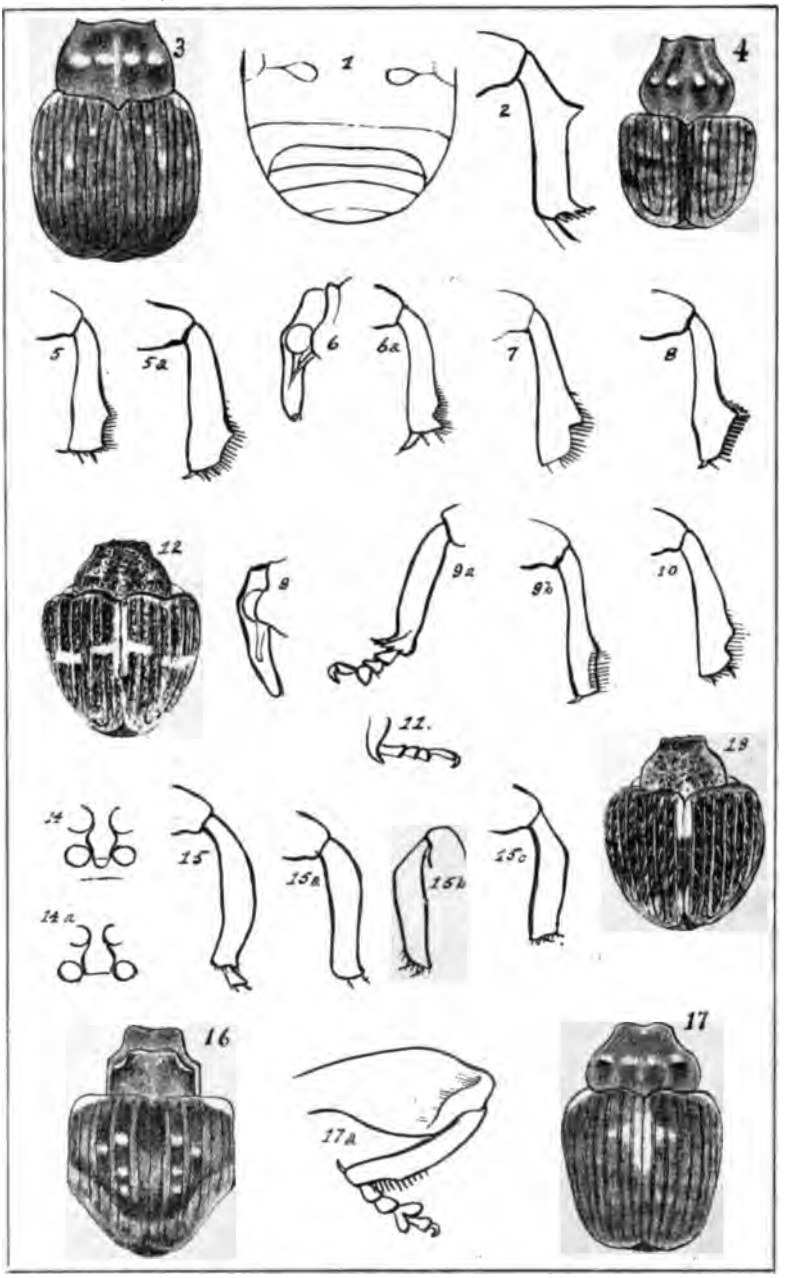
Fig. 11. *Acanthoscelis tarsalis*, anterior tarsus of.
" 12. *Auleutes subfasciatus.*
" 13. " *tachygonoides.*
" 14. " *tenuipes*, underside of pectus; 14*a*, do of *A. nebulosus.*
" 15. Anterior tibiæ of *Auleutes curvipes*; 15*a*, do of *A. asper;* 15*b*, do of *A. langirostris;* 15*c*, do of *A. epilobii.*
" 16. *Pelenosomus cristatus.*
" 17. *Orchestomerus ulkei;* 17*a*, hind leg of do.

## EXPLANATION OF PLATE XIII.

Fig. 18. *Orchestomerus wickhami:* 18*a*, lateral view of do; 18*b*, hind leg of do; 18*c*, anterior femur of do.
" 19. *Acallodes ventricosus;* 19*a*, abdomen of do.
" 20. " *salcoides.*
" 21. *Ceutorhynchus rudis.*
" 22. " *angulatus.*
" 23. " *consanguineus.*
" 24. " *ovipennis.*
" 25. " *hornii.*
" 26. " *ovalis;* 26*a*, antenna of do; 26*b*, anterior tarsus of do.

## EXPLANATION OF PLATE XIV.

Fig. 27. *Ceutorhynchus siculus.*
" 28. " *semirufus.*
" 29. " *medialis.*
" 30. Antenna of *C. mutabilis;* 30*a*, antennal club of *C. convexicollis.*
" 31. Anterior tarsus of *C. oregonensis;* 31*a*, do of *C. persimilis;* 31*b*, do of *C. mutabilis:* 31*c*, do of *convexicollis.*
" 32. *Rileyonymus relictus;* 32*a*, view of upper side of head; 32*b*, anterior tarsus of do.
" 33. *Cœlogaster zimmermanni;* 33*a*, lateral view of head and prothorax of do; 33*b*, underside of prothorax.
" 34. *C. lituratus;* 34*a*, lateral view of head; 34*b*, underside of prothorax.
" 35. *Perenthis vestitus;* 35*a*, lateral view of head of do.
" 36. *Perigaster obscurus.*
" 37. Lateral view of head of *Pelenomus cavifrons;* 37*a*, do of *P. squamosus;* 37*b*, do of *P. pusillus.*
" 38. Antennæ of *Pelenomus sulcicollis.*
" 39. Anterior tarsus of *Pelenomus gracilipes.*
" 40. Tarsus of *Phytobius griseomicans.*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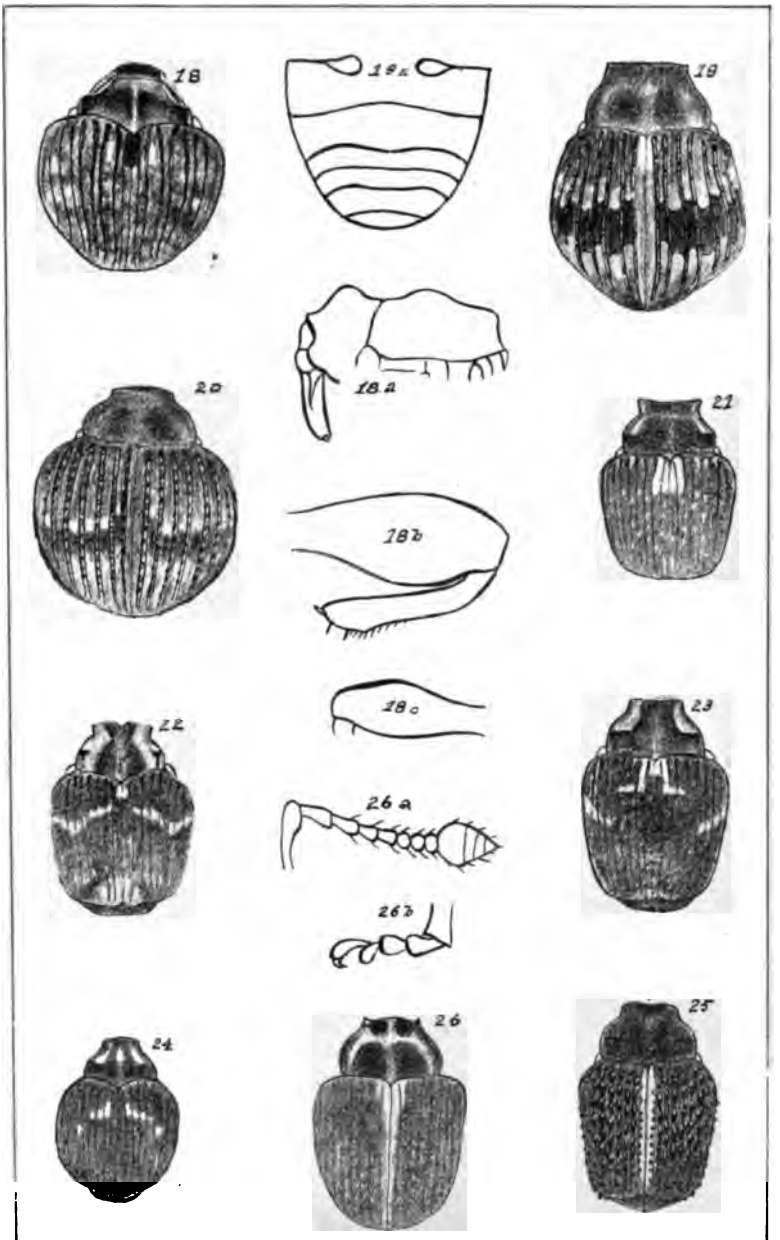
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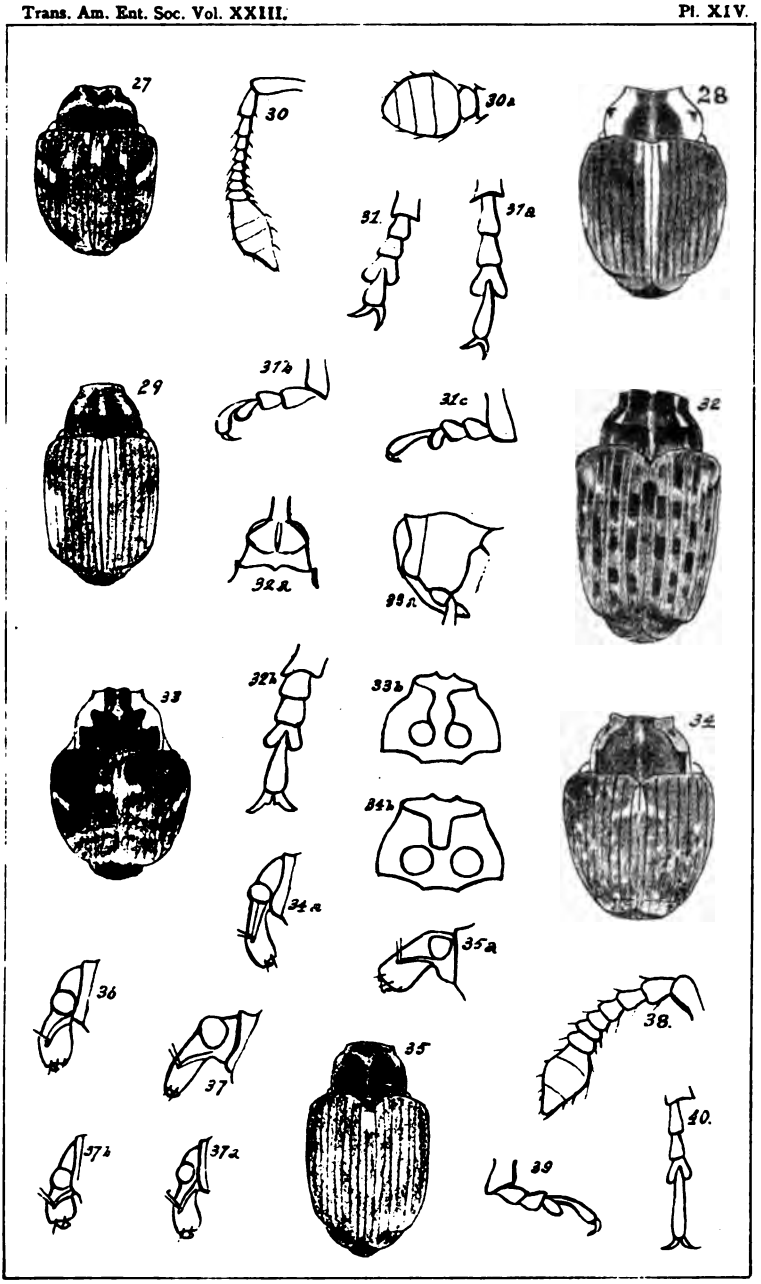
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